

THE  
FAMILY PHYSICIAN

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THE FAMILY PHYSICIAN.







SIR HENRY THOMPSON, F.R.C.S.  
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THE  
FAMILY PHYSICIAN.

*A Manual of Domestic Medicine,*

BY PHYSICIANS AND SURGEONS OF THE PRINCIPAL  
LONDON HOSPITALS.

TO WHICH IS ADDED

THE LADIES' PHYSICIAN.

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*SUBSCRIPTION EDITION.*

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## THE HUMAN BODY.

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1. The neck.
2. The chest.
3. The abdomen.
4. The groin.
5. The thigh.
6. The axilla or armpit.
7. The collar-bone.
8. The navel or umbilicus.
9. The nipple.
10. The great pectoral muscle.
11. The deltoid muscle.
12. The serratus magnus muscle.
13. The external oblique muscle of the abdomen.
14. The rectus muscle.
15. The sartorius muscle.
16. The trachea or wind-pipe.
17. The thyroid body.
18. The right ventricle of the heart.
19. The right auricle of the heart.
20. The arch of the aorta.
21. The vena cava superior.
22. The innominate veins.
23. The internal jugular vein.
24. The carotid arteries.
25. The subclavian artery.
26. The axillary artery.
27. The axillary vein.
28. The right lung.
29. The left lung.
30. The diaphragm or midrib.
31. The liver.
32. The stomach.
33. The large intestine.
34. The small intestines.
35. The œsophagus or gullet.
36. The gall-bladder.
37. The ascending aorta.
38. The vena cava inferior.
39. The right kidney.
40. The left kidney in section.
41. The right suprarenal capsule.
42. The left suprarenal capsule.
43. The right ureter.
44. The left ureter.
45. The bladder.



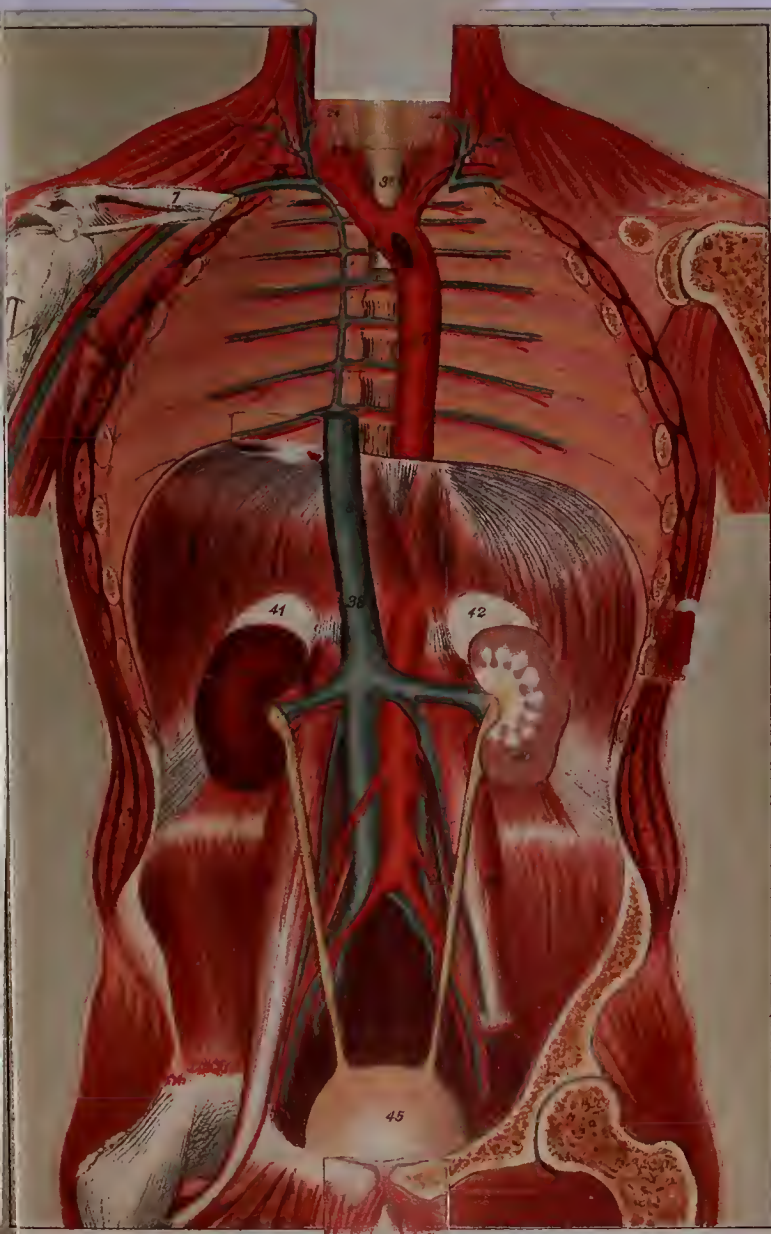






THE HUMAN BODY





the rattlesnake. It has a sweetish and somewhat acrid taste, and increases the flow of the saliva. It is usually used in the form of an infusion, made by pouring half a pint of boiling water over half an ounce of senega root in coarse powder, letting it stand for an hour, and then straining. The dose is from two to three table-spoonfuls. Not only does it loosen the phlegm, but it increases the perspiration. It is seldom given alone, but is combined with carbonate of ammonia, ipecacuanha wine, and other expectorants.

The squill is a thoroughly old-fashioned medicine. It was employed by the ancient Greeks, and is said to have been worshipped by the Egyptians. It is to be feared that now-a-days its reputation is somewhat on the wane. It grows abundantly on the sandy shores of France, Spain, Portugal, and Italy. The bulb, which is something like a large onion, is the portion used for medicinal purposes. We usually obtain it in dried slices, yellowish-white in colour, bitter, translucent, and somewhat horny. There are several valuable preparations of squills, of which the tincture and syrup are the most frequently employed. The former is given in half tea-spoonful, and the latter in tea-spoonful doses, usually with other cough medicines. The ipecacuanha and squill mixture (Pr. 20) is a useful combination. The dose for an adult is two table-spoonfuls every four hours.

In larger doses, squill produces vomiting and diarrhœa. It is seldom used as an emetic, on account of the depression it produces.

## SENNÆ.

The plants which furnish the leaves known to us by the name of senna are low shrubs growing wild in Syria, Arabia, and Upper Egypt, whence the drug is imported into Europe. There has always been some little difficulty about the plants yielding this drug, which has arisen from the fact that different plants have been called by the same name, and different names have been applied to the same plant, a practice which is apt to lead to confusion. If we examine an ordinary specimen of senna we shall find that the leaves are not all alike, but that they vary considerably both in shape and size. Some are long and narrow and sharp-pointed, others are short and broad and blunt at the apex, whilst in addition there are all kinds of intermediate varieties. They have a faint, sickly odour, and the taste is at first sweetish, but afterwards nauseous and bitter.

Senna has long been famed, even proverbially, for its purgative properties; thus Shakespeare says in *Macbeth* :—

“What rhubarb, senna, or what purgative drug  
Would scour these English hence?”

It is generally used either as an infusion or in the form of the ever-popular “black draught.” The infusion is made by pouring half a pint of hot water on an ounce of senna and thirty grains of sliced ginger, letting it stand for an hour in a covered vessel, and then straining. The black draught is prepared as follows:—Dissolve four ounces of Epsom salts and half an ounce of extract of liquorice in fourteen



fluid ounces of infusion of senna with the aid of gentle heat, then add two and a half fluid ounces of tincture of senna and ten fluid drachms of compound tincture of cardamoms, and, finally, a sufficient quantity of infusion of senna to make it up to a pint. The dose of either of these preparations is from two to three table-spoonfuls. Senna is very apt to gripe unless given in combination with salines or some aromatic substance. The confection of senna is a very useful laxative in cases of habitual constipation. It contains, in addition to its essential ingredient, figs, prunes, tamarinds, cassia pulp, extract of liquorice, coriander fruit, and refined sugar. Its efficacy may be greatly increased by the addition of a little sublimed sulphur, as in the confection of sulphur and senna (Pr. 59). Another preparation of senna, an excellent purgative for children, is the *compound liquorice powder*—powdered senna one ounce, powdered liquorice root one ounce, refined sugar three ounces. It is essential that all the ingredients should be finely powdered: they should be thoroughly mixed, and then sifted. The dose for adults is one or two tea-spoonfuls stirred in a little water or milk, and half the quantity may be given to children.

SPANISH FLY.—See CANTHARIDES, p. 784.

#### STAVESACRE.

This is a drug which was largely used by the ancient Greeks.

The stavesacre, or palmated larkspur (*Delphinium staphisagria*), is a native of Provence, and many other parts of the South of Europe. It is a handsome plant, attaining a height of one or two feet, and bearing beautiful blue or purplish flowers supported on long footstalks. Our climate is too cold to admit of its cultivation in the open air in this country. The seeds have the reputation of being very poisonous. They are not administered internally, but are made into an ointment which has the property, by no means to be despised, of destroying lice. The best and cheapest method of making this preparation is to bruise two drachms of the seeds and throw them into an ounce of melted lard, stirring them well together. After an interval the hot mixture must be strained through linen, and the ointment so obtained will be found efficacious in destroying the disagreeable visitors to which we have referred.

STEEL WINE.—See IRON, p. 819.

#### STRAMONIUM.

The thorn apple (*Datura stramonium*) is an annual plant originally imported from America, where it is known as the “apple of Peru,” “devil’s apple,” and “Jamestown weed.” It is frequently found on dunghills, in waste places, and near gardens in the south of England, and particularly in the environs of London. The flowers are large, white, or occasionally light purple, and grow singly from the side of the stem opposite the origin of the leaves. The plant has a nauseous smell, is handsome only when in flower, and consequently is not a general favourite. The action of the stramonium is in the main similar to that of belladonna. The dried

leaves are frequently used either in the pipe, or in a cigarette, for the relief of *spasmodic asthma*. The smoke must be drawn well into the lungs, although it sometimes excites a good deal of cough. Its beneficial effects are more manifest when it is resorted to at the very commencement of the attack, before the paroxysm is fully developed. Dryness of the throat and mouth are to be regarded as indications that too large a quantity is being taken. An allied species, *Datura tatula*, is also used in the treatment of asthma. It may be smoked either in a pipe or cigarette.

STRYCHNINE.—See NUX VOMICA, p. 850.

SUGAR OF LEAD.—See LEAD, p. 824.

#### SULPHATE OF ZINC AND OXIDE OF ZINC.

There are only two preparations of zinc administered internally for medicinal purposes. These are the sulphate of zinc, or white vitriol, and the oxide of zinc.

The oxide of zinc was formerly known by several names which are more remarkable for their fantastic character than for conveying any very definite information respecting the substance to which they were applied. Amongst these the most generally known are "tutty," a word, apparently, of Oriental origin; "lana philosophica," or philosopher's wool, and flowers or calx of zinc. These terms are frequently met with in old works on medicine and chemistry, but their use is now for practical purposes discarded.

The process employed in the preparation of oxide of zinc is somewhat similar to that used in making quick lime. Carbonate of zinc is heated to a dull red heat in a crucible until all the carbonic acid gas is driven off—in other words, until it is completely slaked. The success of the operation is tested by dropping a little of the oxide of zinc into some oil of vitriol and water, when, if any of the carbonate remain, its existence will be at once indicated by the effervescence caused by the escape of the gas. The preparation should be kept in a well stoppered bottle, as, like lime and magnesia, it absorbs carbonic acid from the air, and becomes reconverted into a carbonate. Oxide of zinc is a soft, white, tasteless, inodorous powder, insoluble in water.

It is used occasionally for hysteria, epileptic fits, St. Vitus's dance, neuralgia, whooping cough, and other diseases supposed to be of nervous origin; but there are other remedies on which we should place greater reliance in the treatment of these complaints.

There is one condition, however, in which its use is of considerable value. Its power of arresting the profuse night sweats, which so frequently reduce the little remaining strength of consumptives, is unquestionable. We have many

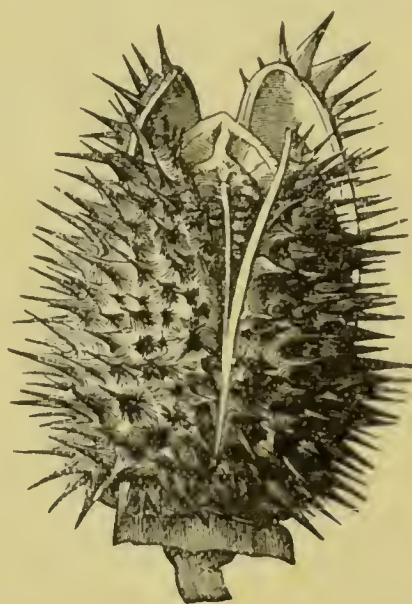


Fig. 16.—FRUIT OF THE STRAMONIUM.



remedies for this purpose, but few upon which greater reliance can be placed. It should be given every night at bed-time in five-grain doses. It is conveniently administered in the form of the oxide of zinc pills (Pr. 66), each of which contains two and a half grains; but it may be given, if thought desirable, as a powder, mixed with a little white sugar. Two are to be taken every night at bed-time when the perspiration is troublesome.

Sulphate of zinc, or white vitriol, is found native at Holywell in Flintshire and in a few other places. It is usually prepared by dissolving zinc in dilute oil of vitriol, and then evaporating down the solution so obtained until it crystallises. Commercial zinc is usually contaminated by traces of iron and lead, a circumstance which renders the purification of the salt advisable. It may readily be freed from its impurities by immersing in the solution a strip of zinc, on which the other metals are soon deposited.

White vitriol cannot be better described than by saying that in its characters it closely resembles Epsom salts, the crystalline form of the two bodies being identical. It possesses a metallic styptic taste.

Sulphate of zinc is used as an *emetic*, particularly in cases of *poisoning*. It is speedy in its action, usually emptying the stomach in a single evacuation, a point of considerable importance in cases where a short delay may make the difference between life and death. Moreover, it produces but little prostration or nausea, another advantage which, particularly with attempted suicides, should not be altogether disregarded. The dose of sulphate of zinc as an emetic is from thirty to sixty grains, but in cases of emergency a tea-spoonful may be thrown into a little water, hot by preference, and taken immediately it has dissolved. Large draughts of hot water, by distending the stomach, promote vomiting. The emetic draught (Pr. 27) consists chiefly of sulphate of zinc.

White vitriol is often useful in *St. Vitus's dance*, and it succeeds best when it is given in doses sufficiently large to make the patient feel sick, or even actually to excite vomiting, once or twice a day. The system soon becomes accustomed to the administration of this remedy, and to maintain its influence over the complaint the dose must be rapidly increased. It is well in the case of children to commence with half a grain three times a day, and to increase it by degrees to two grains every two hours. Sometimes such an amount of tolerance is established that as much as ten grains have to be given every two hours before the slightest feeling of sickness is produced. It may be administered in a little water or in any of the ordinary beverages. A striking improvement is often effected by the drug when given in this way. The occurrence of pain at the pit of the stomach, accompanied by loss of appetite, is to be regarded as an indication that the dose is too large, and it should be discontinued for a time.

There are several other preparations used for external application in addition to those already mentioned.

The oxide of zinc is slightly astringent in its properties, and when mixed with starch is often used as a "dusting powder" (Pr. 80). It is applied to sores and abrasions of all kinds, and frequently to the damp oozing surface left when many skin diseases have imperfectly healed.

Native carbonate of zinc, or "calamine," which is found in great abundance in several parts of England, is sometimes preferred to the oxide of zinc in making the "dusting powder," but there is no advantage in its substitution.

Oxide of zinc enters into the composition of zinc ointment, an ointment the uses of which are legion. It is largely used spread on lint as a dressing in many affections in which the skin is broken, such as ulcers, burns, &c.

Zinc ointment is made as follows:—Take an ounce of lard, melt it, add eight grains of benzoin, then strain it, and when cold mix thoroughly with it eighty grains of oxide of zinc. The object of the benzoin, which is a balsam, is to preserve the ointment. Zinc ointment made with ordinary lard soon becomes rancid, and if applied in this state to a raw surface acts as an irritant, and would probably do more harm than good.

Chloride of zinc is a white, semi-transparent, very deliquescent salt, having powerful and penetrating caustic properties. It is made by dissolving zinc in hydrochloric acid, the resulting product being submitted to a process of purification. It is usually met with in colourless opaque tablets, or rods, which are almost entirely soluble in water. It is used for the removal of tumours, and for the destruction of mothers' marks, large warts, and rapidly spreading skin affections. It is a powerful deodorising agent, and is largely used for this purpose. Burnett's disinfecting and antiseptic fluid is a solution of chloride of zinc, containing 200 grains in the ounce. It is diluted before being used, one pint being added to five gallons of water. It should be remembered that it is a powerful poison when taken internally, and that several fatal accidents have occurred through its administration. A young woman who swallowed an ounce of Burnett's solution died in four hours, in the greatest agony.

#### SULPHIDE OF CALCIUM, OR SULPHURATED LIME.

This is the active constituent of some of our most valuable mineral waters. There are several different methods of preparing it, but one of the best is by mixing equal portions of clean finely-powdered oyster-shells and flowers of sulphur, and heating them to a white heat in a crucible for ten minutes. It is often asked where all the old oyster-shells go to. This is one of their uses, although we can hardly venture to adduce it as a solution to this often-enunciated problem.

When used in the form of baths sulphide of calcium exerts a beneficial influence on old long-standing *skin diseases*. Care should be taken not to employ them so long as there is any inflammation or rawness of the skin; but when this has subsided they may be employed with the greatest advantage. The use of these baths at a high temperature will often relieve *chronic rheumatism* and *gout*, and will restore suppleness to joints which have been distorted and stiffened by these complaints, or by *rheumatic gout*.

There are several forms in which sulphide of calcium may be given internally. A solution may be made of nearly the same strength as the Harrogate waters by dissolving one grain in half a pint of water. The dose of this is for a child one tea-spoonful every hour, and for an adult twice as much. The disadvantage of this



preparation is that it rapidly decomposes, so that in order to obtain any beneficial effect it is essential that the solution should be freshly prepared daily. This is often inconvenient, and as the drug can be given with equal advantage as a pill or in powder it is usually better to employ one of those formulæ (Prs. 68 and 78).

Undoubtedly the most remarkable property of these preparations is the influence which they exert over the formation of matter. When a part is inflamed, and it is feared that matter will form, our drug will not only avert this undesirable consummation, but will frequently speedily reduce the inflammation.

Should there be already a discharge from a boil or abscess the matter will, by the administration of this remedy, be rendered thicker and healthier, and the healing process will be promoted.

In all kinds of *abscesses*, or *threatening abscesses*, the sulphide of calcium pilules should be given.

For *boils* and *carbuncles* this drug is simply invaluable. No time should be lost in commencing treatment by taking either one of the pills, or one of the powders, every hour. In the case of children the latter preparation is, for obvious reasons, to be preferred. The sulphide of calcium lessens the inflammation, breaks down the hard core of the boil, and in this manner greatly shortens the duration of the complaint. In addition to this it in most cases prevents the formation of other boils and carbuncles, and does much to remove the accompanying debility, and improve the general condition of the health.

Children occasionally suffer from *lumps in the neck*, which after a time burst, and discharge a little thin watery matter. Sulphide of calcium will do good in these cases. One or two of the pills must be taken every two or three hours. Sometimes the complaint is of long duration, the discharge going on week after week, and month after month. In such chronic cases the medicine will have to be continued without intermission for some weeks before any marked improvement is noticeable, but the ultimate result is nearly always satisfactory.

#### SULPHUR, OR BRIMSTONE.

Native or virgin sulphur is found chiefly in volcanic regions, our principal supply being obtained from Sicily. It is freed from its impurities by a process of "sublimation," that is to say, it is heated, and the vapour is allowed to condense in the form of a light powder on the walls and floor of a large room or chamber into which it passes. This powder is known as sublimed sulphur, or flowers of sulphur, and is the form most used for medicinal purposes. The common "stick sulphur," or "brimstone," usually contains impurities which render it unfit for internal administration. There is another form of sulphur known as "milk of sulphur," or 'precipitated sulphur,' which is obtained by throwing it down, or precipitating it by means of an acid, from a mixture of lime and sulphur. It is not uncommonly largely contaminated by the lime used in its preparation, a circumstance which would greatly impair its activity.

It is necessary to be acquainted with the characters and appearance of the two

forms of sulphur used in medicine, so that they may not be confounded with other drugs, and in order that their freedom from impurities or adulteration may be ascertained. Sublimed sulphur is a bright yellow powder, somewhat gritty to the touch, destitute of smell or taste—a great advantage in a medicine. It will not dissolve in water, and has consequently to be taken in the solid form. If thrown on the fire it burns with a blue flame, giving rise to a powerful irritating odour familiar enough to every one who remembers the old sulphur matches. The milk of sulphur is a pale yellow powder much lighter in colour than the other form. It is free from grittiness, and burns with the suffocating odour already mentioned.

Sulphur is taken internally chiefly as a laxative. It is very useful in *piles*, the motions which follow its administration being of a soft yielding nature, an advantage which every sufferer from this distressing complaint will readily appreciate. It may also be used with a similar view, and with equal advantage, in *falling of the bowels*, and in *fissure* in the neighbourhood of the passage.

Many people take sulphur in the form of “brimstone and treacle,” every spring and autumn, probably on the theory enunciated by Mr. Squeers, that it “purifies the blood.” It is a custom in favour of which little can be urged, and it is decidedly better to abstain from the use of medicine in any form unless there is a real necessity for taking it. The habitual use of sulphur is apt to impair the digestion and spoil the appetite, a fact which did not escape the acute observation of the talented mistress of Dotheboy’s Hall.

There are several ways in which sulphur may be taken, the old-fashioned and ever popular “brimstone and treacle,” or “flowers of sulphur and molasses,” being in all probability one of the best, the treacle aiding the laxative power of the sulphur. The following is another and equally efficacious form in which it may be given:—

*Confection of Sulphur.*—Flowers of sulphur, four ounces; cream of tartar, in powder, one ounce; syrup of orange-peel, four ounces. These ingredients, when mixed, form an electuary or conserve, one or two table-spoonfuls of which may be taken once or twice a day, or oftener, if the bowels are confined and the motions hard.

Sulphur is used largely in the form of an ointment for the cure of the *itch* and other skin diseases, it proving in many of these cases a most valuable remedy. The ordinary yellow sulphur ointment is made by rubbing up one part of flowers of sulphur in four parts of benzoated lard. Ordinary lard may be used for the same purpose, but the ointment so made is apt to become rancid, and may irritate the skin, and perhaps do more harm than good.

The little black and red spots which so frequently disfigure the complexion and mar the physical beauty of young growing women are best removed by the following lotion:—

*Sulphur Lotion.*—Flowers of sulphur, a tea-spoonful; glycerine, two table-spoonfuls; rose water, half a pint—mix. This is to be applied to the face on an old and soft towel, or pocket-handkerchief, two or three times a day. It is not to be taken internally.



## TAR AND CREASOTE.

There are two different kinds of tar, wood-tar and coal-tar, the former only being used in medicine. Tar is prepared by the destructive distillation of Scotch fir, the process being carried on largely in Stockholm, and also in some parts of America. The method pursued is almost identical with that practised in this country for making charcoal, the essential difference being that in the former case a special provision is made for the collection of the tar which exudes from the smouldering wood.

It would be superfluous to enter into any detailed description of the characters of tar; it is so frequently used for purposes of a domestic or semi-domestic nature that it is familiar enough to everybody.

About a century ago the virtues of tar water were strongly advocated by Bishop Berkeley, in a work entitled "*Siris; a Chain of Philosophical Reflections and Inquiries concerning the Virtues of Tar Water, and divers other Subjects connected together and arising one from the other.*" This curious work, which may be regarded as a dissertation on all subjects, from tar water to the Holy Trinity, seems to have been a great success, for it passed through several editions in a very short time.

The learned and reverend writer appears to have had considerable personal experience of the use of tar, for he says:—"I esteem my having taken this medicine as the greatest of all temporal blessings, and am convinced that under Providence I owe my life to it." He gives the following directions for making the tar water:—"Pour a gallon of cold water on a quart of tar and stir and mix them thoroughly with a ladle or flat stick for the space of three or four minutes, after which the vessel must stand eight-and-forty hours, that the tar may have time to subside, when the clear water is to be poured off and kept covered for use; no more being made from the same tar, which may still serve for common purposes." He directs that half a pint should be taken night and morning on an empty stomach. It may, he says, be made more palatable by mixing with each glass a drop of oil of nutmeg, or a tea-spoonful of mountain wine.

Bishop Berkeley speaks of tar water as being a cure for "foulness of blood, ulceration of the bowels, consumptive coughs, pleurisy, pneumonia, erysipelas, asthma, indigestion, cachectic and hysteric cases, gravel, dropsy, and all inflammations." In fact, about a century ago tar water was for a time regarded as universal panacea.

When the tar water mania was at its height, an ingenious hoax was perpetrated on the Royal Society. It appears that a sailor who had broken his leg was advised to communicate to that learned body a report of his case. The account he gave was that, having fallen from the top of the mast and fractured his leg, he had dressed it with nothing but tar and oakum, and yet in three days he was able to walk as well as before the accident. The story at first sight appeared quite incredible, as no such efficacious qualities were known in tar, and still less in oakum: nor was a poor sailor to be credited, on his own bare assertion, of so wonderful a cure. The Society very reasonably demanded a fuller relation, and the corroboration of the evidence. Many doubted whether the leg had been really broken. That part of the story had been amply verified. Still, it was difficult to believe that the man had

made use of no other application than tar and oakum ; and how *they* could cure a broken leg in three days, even if they could cure it at all, was a matter of the utmost wonder. Several letters passed between the Society and the patient, who persevered in the most solemn asseverations of having used no other remedies, and it appeared beyond a doubt that the man spoke the truth. But charming was the plain, honest simplicity of the sailor : in a postscript to his last letter he added the words : “I forgot to tell your honours that the leg was a wooden one.”

After a time the use of tar in the treatment of diseases was, in this country, almost abandoned. There is no doubt that the statements made as to its efficacy were greatly exaggerated, but at the same time it must be admitted that tar is a very valuable remedy for many complaints. It is of very great value in the treatment of *winter cough*, *chronic bronchitis*, and *asthma*. It is largely used for these complaints both in France and Belgium, and patients who have tried it usually speak of it most enthusiastically. They say that by its use they are enabled to curtail the duration and lessen the severity of their attacks, and there can be no doubt that such is the case. An improvement is, as we can certify, usually noticeable in from four to seven days, it rapidly increases, and in about three weeks the cough is practically well.

There are several ways in which tar can be administered. We have already spoken of Berkeley's tar water. The French call it *eau de goudron*, and take it with sugar and water, or with claret at dinner, the combination being almost tasteless—a point of no small consideration with them. Anybody who would make a few gallons of tar water at the commencement of the winter for the benefit of the old people with coughs and colds would, we are sure, be doing them a service. They will not make any difficulty about taking it.

It is often convenient to be able to give tar in a more portable form. By the addition of a little wax and powdered liquorice root it can be made into pills, each containing a dose of two grains. Small capsules are also made containing from two to three grains, and may be obtained from any French chemist. Larger capsules are also sold, but they contain a dose larger than it is necessary to administer in cases of winter cough. There are several other preparations containing this drug in use on the Continent ; for example, the *dragées de Christiania au goudron de Norvège*, which are elegant—and expensive—little bonbons, each containing five grains of tar. The tar pills (Pr. 70) will be found very useful, one to be taken every four hours.

Creasote is a substance obtained by the distillation of wood tar. It is an almost colourless liquid, having a powerful characteristic odour. It is a favourite remedy for the *toothache*, and when a few drops are introduced into the hollow of a decayed and painful molar, it will usually afford relief. It is also a good remedy for checking *vomiting* of all kinds, and is largely used in the treatment of the sickness of pregnancy, cancer and ulcer of the stomach, and Bright's disease. It is frequently recommended for *sea-sickness*. It is used in the treatment of coughs and colds, and is especially useful in chronic bronchitis or winter cough. Either the creasote linctus (Pr. 58) or the creasote mixture (Pr. 23) may be used for cough. For other complaints it should be given in two-grain doses every four hours, and is best made into pills.



## TARTAR EMETIC.

This salt is a combination of tartaric acid with potash and antimony, and is known chemically as "tartrate of antimony and potash."

It forms small colourless transparent crystals, freely soluble in water, destitute of odour, and having a sweetish metallic taste.

For internal use it is by far the best and most active of all the antimony preparations. It is often given in the form of antimony wine, but for most purposes a simple freshly-prepared solution in water is preferable. Antimony wine is made by dissolving forty grains of tartar emetic in a pint of sherry.

The ordinary dose of tartar emetic, when used to excite vomiting, is two grains dissolved in a little water. The corresponding dose of the wine is a fluid ounce, or two table-spoonfuls. Tartar emetic is somewhat tardy in its action, and often requires from twenty minutes to half an hour to produce vomiting, a circumstance which renders it almost useless in cases of poisoning. All nauseating medicines produce more or less weakness and prostration, but in tartar emetic these properties are pre-eminently developed.

When tartar emetic is administered for its constitutional effects, and not to produce vomiting, it is most advantageously given in small doses, and frequently. It is a good plan for many complaints in which antimony proves useful to dissolve a grain of tartar emetic in half a pint of water (Pr. 46), and to give a tea-spoonful of this every quarter of an hour for the first hour, and subsequently hourly.

Tartar emetic is a powerful remedy, and even this small dose may, when first given, cause vomiting. Should such be the case, the disagreeable complication may usually be avoided by adding sufficient water to make the mixture up to a pint, giving tea-spoonful doses of this diluted solution.

This drug, administered as above directed, is pre-eminently useful in *pneumonia* or *inflammation of the lungs*. Since the general adoption of this mode of treatment the number of deaths from this disease has greatly decreased. In the majority of cases the tartar emetic reduces the frequency of the pulse and breathing, eases the pain in the side, and, above all, checks the further spread of the inflammation. The earlier the drug is given the greater the chances of success.

In *bronchitis* or a *bad cold on the chest*, especially when the phlegm is copious, frothy, and difficult to expel, tartar emetic may be employed with considerable advantage. It may be given in the form of the mixture, or five drops of the wine may be added to each dose of the effervescing ammonia mixture (Pr. 99), and taken every four hours.

Children from six to twelve years of age are often attacked on the slightest exposure to cold with *wheezing* on the chest and difficulty of breathing. The wheezing is often so severe as to be heard at some distance, and the shortness of breath may be so troublesome as to necessitate the propping up of the little sufferer in bed. There may be, in addition, a nasty, hollow, barking cough, and very often the voice is quite hoarse. The attacks are often quite like those of asthma in their character and intensity. The tartar emetic mixture is in these cases invaluable, and will generally effect a cure.

That form of *cold on the chest* which in children is associated with vomiting and diarrhoea is usually quickly arrested by tartar emetic.

This drug is usefully employed in typhus and other fevers when there is much excitement and furious delirium.

Years ago there was no more popular medicine, and none more valued, than "James's powder." Now-a-days it is seldom or never used. It was a white, gritty, tasteless, odourless powder, consisting chiefly of antimony and phosphate of lime. It enjoyed a reputation for the cure of almost every disease, but even its strongest advocates were obliged to admit that its action was extremely uncertain. So highly was it esteemed that it frequently sold for half a guinea an ounce. Its reputation is of the past.

## TEA.

It is estimated that tea is habitually consumed by not less than five hundred millions of people, or about one-half of the human race. Amongst the Chinese and the inhabitants of Japan, Thibet, and Nepaul it is drunk by all classes three or four times a day. In Asiatic Russia, in a large portion of Europe, in North America, and in Australasia it is a favourite beverage.

In China, tea has been used as an article of diet from a very remote period of antiquity. Curiously enough, they have no record or tradition respecting its first introduction. The Japanese, however, tell us that in the year 519, a holy man named Darma, the son of an Indian monarch, took refuge in China, and publicly taught that the only way to attain happiness was to eat nothing but vegetables and go without sleep. This enthusiastic vegetarian and anti-morpheusian was, however, on a hot summer's day overcome by drowsiness, and fairly nodded before his congregation. When he awoke to a knowledge of his violation of his own precept, great was his self-reproach, and being determined that he would not transgress a second time, he cut off his eyelids and threw them on the ground. In due time they took root, and gradually developed into the plant now known as tea.

Tea was probably first introduced into Europe about the middle of the seventeenth century, for in 1661 Pepys writes in his diary, "I sent for a cup of tea (a Chinese drink), of which I had never heard before." At first its use was not very common, as in the same century the East India Company considered it a rare gift to present the King of England with two pounds and two ounces of tea.

The plant which yields the tea leaves is a native of China, and still grows wild on the hills both of that country and Japan. The tea plants are raised from seed, which is sown in March. When a year old, the young bushes are planted out, and when placed in rows three or four feet apart have some resemblance to gooseberry bushes. The season for gathering varies in different districts, but the principal leaf harvest is in May or June. The leaves are plucked by women, and are usually gathered at three successive periods. The youngest and earliest leaves are the most tender and delicate, and give the highest flavoured tea. The second and third gatherings are more bitter and woody, and yield less soluble matter to water. The refuse and decayed leaves and twigs are sold under the name of "brick tea."

Tea leaves, when freshly gathered, are destitute of odour and flavour. The



pleasant taste and aroma for which they are so highly valued are developed in the process of drying. The tea is rolled both to diminish its bulk and to enable the leaves to preserve their flavour. It is not fit for use until it is at least a year old, and the rich and luxurious Chinese usually keep their finest teas in porcelain

jars furnished with narrow necks, in order to prevent the aroma from escaping. The quality of the tea depends chiefly on the method employed in drying. Either black or green tea may be prepared at will from the same leaves gathered at the same time and under the same circumstances. It is by lengthened exposure to the air in the process of drying, accompanied by perhaps a slight heating and fermentation, that the dark colour and distinguishing flavour are given to the black teas of commerce.

The principal varieties of black tea are known as Bohea, Congou, Souchong, and Pekoe. The chief green teas are Twankay, Hyson, Imperial, and Gunpowder.

The practice of scenting teas is very common, and various odoriferous plants are employed for that purpose in different parts of China. Many teas, especially the green teas, are artificially coloured by the addition of blue, white, and yellow colouring substance. A mixture of Prussian blue and burnt gypsum was formerly extensively used for the purpose, but indigo is now coming into fashion. It is said that one day an



Fig. 17.—BRANCH OF THE TEA PLANT.

English gentleman in Shanghai, being in conversation with some Chinese from the green-tea country, asked them what reasons they had for dyeing the tea, and whether it would not be better without undergoing that process. They acknowledged that tea was much better when prepared without having any such ingredient mixed with it, and that they never drank dyed tea themselves; but remarked that as foreigners seemed to prefer having a mixture of Prussian blue and gypsum with their tea, to make it look uniform and pretty, and as these ingredients were cheap enough, the Chinese had no objection to supply them, especially as such teas always fetched a higher price.

It is curious that although tea is so extensively used, there is still considerable diversity of opinion as to the best method of preparing it. The Chinaman puts his tea in a cup, pours hot water over it, and drinks the infusion off the leaves without the addition of either sugar or milk. The Japanese powder the leaves

before putting them in the pot. In Morocco they put green tea, a little tansy, and a great deal of sugar into a tea-pot, and fill up with boiling water. In Russia a squeeze of a lemon often takes the place of our milk or cream ; and in Germany, where tea is made very weak, it is common to flavour it with rum, cinnamon, and vanilla.

On the first introduction of tea into this country it was lauded as a remedy for almost every ailment afflicting mankind. It was said to remove lassitude, purify the liver, improve the digestion, create appetite, strengthen the memory, cure agues and fevers, and act as a specific for consumption. One panegyrist says that while never putting the patient in mind of his disease, it cheers the heart without disordering the head, strengthens the feet of the old, and settles the heads of the young, cools the brain of the hard drinker, and warms that of the sober student, relieves the sick, and confirms the healthy. Epicures drink it for want of an appetite, *bon-vivants* to remove the effects of a surfeit of wine, gluttons drink it as a remedy for indigestion, politicians for the vertigo, doctors for drowsiness, prudes for the vapours, wits for the spleen, and beaux to improve their complexion. He sums up by declaring tea to be a treat for the frugal, a regale for the luxurious, a successful agent for the man of business, and a healthy amusement for the idle.

Tea is a very useful drug, but this picture, we need hardly say, is somewhat over-drawn. Nevertheless, tea exerts a very decidedly stimulant and restorative action on the nervous system, which is perhaps aided by the warmth of the infusion. As an article of diet it proves of the greatest value for soldiers. The hot infusion is particularly useful in over-fatigued conditions of the system, and under these circumstances there can be no doubt that it is infinitely preferable to alcoholic drinks. The hot infusion is potent against both heat and cold, and is a most valuable accompaniment on long journeys. It possesses, moreover, the valuable property of purifying even the most brackish waters.

There are certain complaints in which the use of tea is distinctly prejudicial. In flatulent dyspepsia, or indigestion accompanied by the formation of large quantities of wind, it is especially injurious, and its use often greatly retards the progress of cure. Many women ruin their digestive powers by taking large quantities of weak tea three or four times a day. The excessive consumption of tea, especially when combined with a poor diet, leads to a condition of nervousness and irritability which is quite pitiable. This habit is especially prevalent among dressmakers and others whose occupations are of a sedentary nature. In the out-patient department of many of our hospitals the effects of excessive tea-drinking are almost as noticeable as the results of intemperance as regards alcohol, and that is saying a great deal. It is not an uncommon practice with enthusiastic students to resist the claims of nature for repose, and keep themselves awake at night by the use of green tea. The object is attained, but at a great price, the destruction of health and vigour, both of body and mind, being too often the penalty.



## TOBACCO.

Tobacco claims consideration in a work on Materia Medica, not so much from its value as a medicinal agent as from the fact that it is almost universally used for the production of its sedative or narcotic effects.

The tobacco (*Nicotiana tabacum*) is probably a native of America—at all events, it was extensively cultivated and used by the inhabitants of various parts of that continent long before its discovery by Europeans. The aborigines of tropical America must have rolled up their tobacco leaf and dreamed away their lives in smoky reveries ages before Columbus was born. With them the pipe was a great diplomatist. In making war, in concluding peace, in all their deliberations, both public and domestic, it played an important part, and no treaty was ever ratified without the passage of the calumet. The transfer of the pipe from mouth to mouth was a token of amity and friendship, and with the chivalry of the forest it was a gage of honour which was seldom violated. From America tobacco was introduced into Spain, and in a few years a knowledge of its properties spread all over Europe. When Walter Raleigh brought the plant from Virginia to England, in 1586, whole fields of it were already under cultivation in Portugal. It is probable that the cultivation of this plant in Europe preceded that of the potato by from 120 to 140 years.

The generic term, “*Nicotiana*,” was bestowed on the plant in honour of Jean Nicot, who brought some tobacco from Lisbon and presented it to Catherine de Medicis as a herb possessing valuable properties. It is usually stated that the name tobacco was given to the plant by the Spaniards, who took it from Tobaco, a province of Yucatan. Humboldt, however, asserts that the word belongs to the ancient language of Hayti, or Saint Domingo, and that originally it was applied not to the herb, but to the tube through which the smoke was inhaled.

On the first introduction of tobacco into Europe every effort was made by writings, imposts, and bodily punishment, to restrict or put down its use. It is said that more than a hundred books were written to condemn the use of tobacco, foremost among them being the celebrated *Counterblaste to Tobacco* of James I., in which he speaks of it as being “a custom loathsome to the eye, hateful to the nose, harmful to the brain, dangerous to the lungs, and in the black, stinking fume thereof nearest resembling the horrible Stygian smoake of the pit that is bottomless.” There is an old tradition of the Greek Church which ascribes the inebriation of the patriarch Noah to the temptation of the devil by means of tobacco, so that the king was not altogether without authority for the black Stygian parentage which he assigns to its fumes. In Russia, smoking was absolutely prohibited, the knout being the punishment for the first, and death for the second offence. In Bern so much importance was attached to the custom that in the list of offences it followed the crime of adultery. In some of the Swiss cantons a council cited all smokers before them, and the innkeepers were ordered to inform against those who were found smoking in their houses. Urban VIII. was so enraged against the practice that he went in State to the Vatican and thundered excommunication on every soul who took the accursed thing in any shape or form into a church. As might have been

expected, opposition and persecution excited only more general attention to the plant, awakening curiosity regarding it, and tempting people to try its effects, so that the use of the drug spread rapidly. The Turks and Persians have become the greatest smokers in the world, although their priests and sultans declared that smoking was a sin against their holy religion. The custom is now almost universal, as has been truly said, or rather sung :—

“Tobacco engages  
Both sexes, all ages,  
The poor as well as the wealthy;  
From the court to the cottage,  
From childhood to dotage,  
Both those that are sick and the healthy.”

Tobacco thrives in nearly every part of the globe. Amongst narcotic plants it occupies a place similar to that of the potato amongst food plants. It is the most extensively cultivated, the most hardy, and the most tolerant of changes in temperature, altitude, and general climate. The plant was formerly grown in many parts of England, particularly in Yorkshire, but now its cultivation is by law restricted to half a pole “in a physic or university garden, or in any private garden for physic or chirurgery.”

What are the effects produced by smoking? In the case of the novice the symptoms produced are nausea, vomiting, extreme weakness, relaxation of the muscles, and a depressed action of the heart, the last mentioned being indicated by pallor of the face, weakness of the pulse, cold sweats, and a general tendency to faint. The effects produced on the habitual smoker are, of course, widely different, and of a much more pleasurable description. It is very difficult to analyse the sensations produced by the use of tobacco; we are usually content to recognise the fact that they are pleasurable, and to smoke on in peace. By the use of tobacco some people seem able almost to liberate the mind from the trammels of the body, and to give it a freer range and more undisturbed liberty of action. Bulwer, in his “Night and Morning,” exclaims, “A pipe! it is a great comforter, a pleasant soother! Blue devils fly before its honest breath! It ripens the brain, it opens the heart, and the man who smokes thinks like a sage, and acts like a Samaritan.”

There is no want of testimony in favour of the use of the drug. The “souveraine weed,” as Spenser calls it, has been extensively lauded both in prose and verse. Kingsley, in “Westward Ho!” speaks of it as “a lone man’s companion, a bachelor’s friend, a hungry man’s food, a sad man’s cordial, a wakeful man’s sleep, and a chilly man’s fire.” Old Hobbes of Malmesbury, the first and clearest of English philosophers, regularly had his twelve pipes a day, and kept to it till he was nearly as old as old Parr himself. Robert Hall, the most eloquent of English preachers, and John Foster, the most original of English essayists, were smokers; Campbell was a patron of the weed, and Byron’s lines to “Sublime Tobacco” are as well known as Campbell’s address to the “pungent nose-refreshing weed.” Sir Walter Raleigh took it to the day of his death, for Aubrey says “He tooke a pipe of tobacco a little before he went to the scaffold, which some female persons were scandalised at, but I think ’twas well and properly donne to settle his spirits.”



Thackeray was a great admirer of the weed, and in one of his essays says that he would rather smoke up the chimney than not smoke at all.

Is the use of tobacco injurious to the health? This is a question which it is very difficult to answer. By the non-smokers it is said that it causes blindness, palpitation of the heart, paralysis, diseases of the teeth, mouth, and tongue, dyspepsia, diarrhœa, and even falling of the bowel. The smokers, on the other hand, assert that you may smoke to all eternity without in the slightest degree injuring your health—in fact, you are rather likely to improve it. Of course, no one doubts for a moment that smoking is a very bad thing for boys, and that many of the pallid sickly-looking lads that one sees in the streets with dirty short pipes in their mouths would be benefited by a substitution of a fair allowance of birch for tobacco. The weight of evidence is in favour of the view that tobacco smoked in moderation by full-grown, healthy adults is not injurious to the system. We cannot undertake to define the term “in moderation”—each man must decide that for himself. There can be no doubt, however, that a man who lights his pipe or cigar in the morning before breakfast is decidedly overstepping the bounds of moderation. Smoking in excess is undoubtedly a very harmful habit, disordering digestion, lessening the appetite, inducing restlessness at night with disagreeable dreams, and weakening both body and mind. Sore throat and chronic dyspepsia may often be clearly traced to excessive smoking, and it will be found that the habitual smoker has generally a thickly coated tongue. There is one thing to be said, however, and that is, that the symptoms quickly disappear when the habit is discontinued.

Does smoking make people drink? There is a great diversity of opinion even on this subject. Let us avail ourselves of the experience of a distinguished scientific observer, who has devoted especial attention to the subject. He says:—

“The first time our reader walks down Regent Street after seven in the evening, let him drop into any place he chooses, and let him see who gets to his fifth glass of grog soonest—the smoker, or the man who does not; who soonest, with a voice increasingly husky and indistinct, indulges in a promiscuous style of conversation, more amusing than convincing—certainly not the smoker. Not that no smoker is ever overcome in a moment of temporary weakness—the best of us, alas, are but men! To err is human. We ourselves have risen from our bed with a slight sensation of headache, and a conviction, by no means slight, that we had made fools of ourselves the previous night. But it stands to reason that you, with a cigar in your mouth, should drink slower than the man who has nothing else to do but drink. You cannot drink equal. While you have lit your cigar and drawn half a dozen whiffs, and drank the health, temporal and eternal, of your divine Adele or dearly beloved Ellen, your friend, who does not smoke, has left nothing in his glass but a silver spoon. This is not random assertion—what a gent might term chaff. We have tried the experiment over and over again, and are quite ready to repeat it, my dear sir, at your expense.”

Tobacco contains an alkaloid known as *nicotia*, which is the active constituent of the plant. It is a colourless, volatile, oily liquid, having a powerful odour of tobacco and a burning taste. It is almost as powerful a poison as prussic acid. A single drop given to a rabbit killed it in three and a half minutes. It is

supposed that the "juice of the cursed hebenon," with which Hamlet's father was poisoned, consisted of this substance.

A small quantity of nicotia, or at all events of the products resulting from its decomposition, is always found in tobacco smoke. The form and construction of the pipe undoubtedly influence the proportion of the active ingredients which it contains. Thus, the Turkish and Indian pipes, in which the leaf burns slowly and the smoke bubbles up through water, absorb a large proportion of the poisonous vapours. The reservoir of the German pipe retains the larger portion of the oily and other products of the burning tobacco; and the long stem of the Russian pipe performs a similar function. The Dutch and English clay pipes retain least of any.

In what cases should tobacco be used medicinally? Smoking increases the flow of saliva, and many on this account maintain that it aids digestion and is useful in dyspepsia. In an old song we are told that

"It helpeth digestion,  
Of that there's no question;  
The gout and the toothache it easeth.  
Be it early or late,  
'Tis never out of date,  
He may safely take it that pleaseth."

This, however, can hardly be said to sum up the therapeutics of tobacco. For example, it acts as a slight purgative, and a pipe or cigar smoked after breakfast is often sufficient to ensure an easy and satisfactory relief of the bowels. The practice is not without advantage for persons troubled with *habitual constipation*. Ladies are occasionally recommended to use cigarettes for a similar purpose—the thin end of the wedge.

Tobacco is often used with advantage in spasmodic *asthma*.

It is usually unsafe to use tobacco as an external application, as sufficient may be absorbed to cause symptoms of poisoning.

#### TREACLE—TAMARINDS—FIGS—PRUNES—HONEY—MANNA.

These substances are all sufficiently familiar to us, and have long been valued medicinally for their laxative properties.

Treacle is the uncrystallisable syrup which drains from the moulds in the preparation of loaf sugar. In doses of a tea-spoonful and upwards it forms a very pleasant laxative, and is often given in combination with sulphur as "brimstone and treacle."

Tamarind is the pulp of the fruit of the tamarind tree, growing in the East and West Indies. In the preparation and preservation of tamarinds the fruit, having been first stripped of its shell, is placed in a cask, and then covered with warm water. It possesses an agreeable sweetish taste, and is considered no little luxury in hot climates. Medicinally it is used as a mild, cooling laxative. The dose is a quarter of an ounce or more, and it is sometimes made into a whey with milk.

Figs from the earliest ages have been held in great repute. In a primitive



condition of society they served to furnish the nations of the East with an article, not of occasional luxury, but of daily and constant food. So highly were they esteemed by the Athenians that their exportation was prohibited under a heavy penalty. In Rome they were carried after the wine in the processions in honour of Bacchus, and the old gentleman himself is supposed to have owed his corpulence and vigour not to the grape but to the fig. By the Jews a bad fig year was regarded as a most serious calamity. Fresh figs, when ripe, are soft and succulent, and are a digestible, wholesome, and delicious fruit, which may be used with advantage in habitual constipation. When the fresh fruit is not obtainable, we must be satisfied with the dry, although as a medicinal agent it is far less efficacious.

Prunes are the dried fruit of the common plum, prepared by exposing them alternately to the heat of an oven and to the open air. They are very nutritious and form an excellent laxative for children. We have the most implicit confidence in stewed prunes.

In honey we have another very useful and agreeable medicine. It, as everybody knows, is secreted by the nectaries of flowers and sucked by the bees into their crops, where it undergoes some slight change, and is then stored up in the comb. The finest honey is that which is allowed to drain from the comb, and if obtained from hives which have never swarmed it is called "virgin honey." It partakes of the aroma of the plants from which it has been collected. It may be clarified by melting it in a water-bath, and straining it while hot through flannel. It is composed chiefly of sugar and water, but contains in addition gum and wax and a little volatile oil derived from the flowers. It is often used to cover the taste of other medicines, but taken alone it acts as a laxative. A mixture of honey and vinegar forms a useful gargle for sore throats.

Manna is an exudation obtained by making incisions into the trunk of the flowering ash, cultivated for the purpose in Sicily and Calabria. The tree is a native of Southern Europe, but is not uncommonly met with as an ornamental plant in our gardens and pleasure grounds. Although we are principally indebted for our manna to the ash, yet other trees, such as the larch, fir, orange, willow, mulberry, and oak, also produce it, although in smaller quantities. The trees are not tapped until July or August, when they have ceased to produce new leaves. Incisions about two inches in length are made in the stem by means of a hooked knife, and from these apertures the juice exudes and gradually solidifies. The best description of manna, called "flake manna," forms long white pieces not unlike stalactitic masses, from one to six inches in length, and an inch or two in breadth. It is a pleasant adjunct to many purgative medicines, and in doses of half an ounce or more acts as a mild laxative.

TURPENTINE, SPIRITS OF.—See p. 801.

## HYGIENE.

“HYGIENE is the art of preserving health : that is, of obtaining the most perfect action of body and mind during as long a period as is consistent with the laws of life ; in other words, it aims at rendering growth more perfect, decay less rapid, life more vigorous, death more remote.”

The above is the definition of hygiene given by Dr. Parkes, in his incomparable work on “Practical Hygiene.”

We cannot do better than begin by offering a few practical remarks on the hygiene of the past, hoping in that way to bring forcibly under the reader's notice how the necessity for hygienic science has arisen, what it has already effected, and what we may expect from it, both for good and for evil ; and since these points have been very concisely put forth in a lecture by Dr. Poore, published in the *Medical Times and Gazette* for June 6th, 1874, we have, with the author's permission, made extensive quotations from it.

“There may have been a time in the history of the world—when it was very young, however—when the public health took care of itself, and the conditions of existence were such as not to be likely to cause disease. When populations were very thin ; when man was a noble savage, almost untrammelled by clothing, living by hunting, never residing in dense crowds, leaving his effete matters to be disinfected by the earth, the air, and the sun ; frequently changing his camping-ground ; and before he had learnt to become luxurious, and to spend his time in habitations artificially warmed and artificially lighted, and to eat and drink a great deal more than is good for him—when, in fact, he lived a life more like that of a wild animal (perhaps he might have been rightly regarded as a wild animal), it is possible that disease was rare, that men attained to the years of some of the Biblical patriarchs, and died at last of sheer old age, without ever having had even measles or hooping-cough, which nowadays none of us escape.

“If we look at the history of the world, we find that wherever man has been collected into crowds there disease has broken out.

“The Bible is full of such instances. The Israelites in the desert were frequently smitten by pestilence, and many of the laws promulgated by Moses had most direct bearing upon public health. He at least seems to have recognised the importance of separating the sick from the healthy, and of thoroughly disinfecting the persons, clothes, and even the houses, of those afflicted with leprosy or other forms of sickness. The plague which broke out amongst the hosts of Sisera, and the plague recorded by Homer as occurring at the Siege of Troy, are familiar ancient examples.

“It is not too much to say that, in the history of every great city, many chapters would have to be devoted to the history of its pestilences.

“From the fourteenth to the seventeenth centuries, at a period when art was at its zenith ; when many of the cities of Europe were as crowded with inhabitants as



they are at present ; when Genoa, Rome, Naples, Venice, Paris, and London were already great centres of commercial or political activity, filled with inhabitants sunken, for the most part, in the grossest superstition—in the pre-scientific era, when men lived as artificially as they do at present, without the least knowledge of warding off the evils which such an artificial existence certainly brings with it—in an age when flourished the greatest painters, sculptors, poets, and architects which the world has seen, but before the dawn of the Baconian philosophy—disease was more rampant, perhaps, than at any period of the world's history.

“ In 1348, 100,000 persons are said to have died in London alone of the ‘ black death ’—a number frightful enough, but small when compared with the 40,000,000 deaths which occurred from the same cause throughout Europe. In the sixteenth century there were five outbreaks of the sweating sickness, an epidemic scarcely less fatal than the ‘ black death ;’ and in the first sixty-six years of the seventeenth century there were five outbreaks of plague, the last of which, in 1665, claimed nearly 70,000 victims in London alone.

“ Let us look at the bill of mortality for London in the year 1661. I have selected 1661 because it seems to me to be a good average bill, neither very high nor very low ; and from it we may learn what were the diseases which our ancestors had to fear in an ordinary way.

*“ Bill of Mortality for the Year 1661.*

Abortive and stillborn . . . . .	511	Killed by several accidents . . . . .	26
Aged . . . . .	1302	King's evil . . . . .	48
Ague and fever . . . . .	3490	Lethargy . . . . .	11
Apoplexy and suddenly . . . . .	108	Leprosy . . . . .	1
Bedrid . . . . .	3	Lunatick, distracted, and frenzy . . . . .	11
Bleeding . . . . .	5	Megrims . . . . .	3
Bloody flux, seowring, and flux . . . . .	314	Measles . . . . .	188
Burnt and scalded . . . . .	4	Mother . . . . .	4
Cancer, gangrene, and fistula . . . . .	69	Murdered, slain, and shot . . . . .	52
Canker, sore mouth, and thrush . . . . .	95	Overlaid and starved . . . . .	37
Childbed . . . . .	224	Palsy . . . . .	26
Chrisomes and infants . . . . .	1400	Plague . . . . .	20
Cold, cough, and hiccough . . . . .	14	Planet . . . . .	3
Colick and wind . . . . .	186	Plurisy . . . . .	11
Consumption and tissick . . . . .	3788	Poisoned . . . . .	2
Convulsion . . . . .	1198	Quinsy and sore throat . . . . .	13
Cut of the stone and stone . . . . .	36	Rickets . . . . .	413
Dropsy and tympany . . . . .	967	Rising of the lights . . . . .	227
Drowned . . . . .	57	Rupture . . . . .	18
Executed . . . . .	16	Seurvy . . . . .	85
Frighted . . . . .	2	Sores, uleers, broken and bruised legs . . . . .	61
Flox and small-pox . . . . .	1246	Spleen . . . . .	5
Found dead in the streets, fields, etc. . . . .	8	Spotted fever and purples . . . . .	335
French-pox . . . . .	44	Strangury . . . . .	23
Gout and seiatiea . . . . .	11	Stopping of the stomach . . . . .	170
Grief . . . . .	17	Surfeit . . . . .	212
Griping in the guts . . . . .	1061	Swine-pox . . . . .	6
Hanged and made away themselves . . . . .	13	Teeth and worms . . . . .	1195
Head-mould-shot and mould-fallen . . . . .	28	Vomiting . . . . .	20
Jaw-fallen . . . . .	2		
Jaundies . . . . .	141		
Imposthume . . . . .	160		
		Total . . . . .	19,771

“ The gross mortality was 19,771, which, if we take the population of that time

at half a million (for which there seem many good reasons), gives us an annual death-rate of 39·5 per 1,000 people living.

“The average death-rate at the present day in London may be put at 24 per 1,000; so that, whereas the average age attained by the population was then only twenty-six years, it may now be stated as averaging nearly forty-two years. If, then, we may say that the science of public health has, in the first two centuries of its existence, lengthened the average lives of us Londoners by sixteen years, I think I need add no more facts to recommend the subject to your serious consideration.

“An inspection of this bill of mortality forces many reflections upon us. There are causes of death which have now almost or completely disappeared. For instance, ague is very rarely seen at all in London, and when seen is never fatal. This fact is surely due to hygienic improvement in the matter of draining. Bloody flux, which was probably dysentery, has also almost disappeared, and from similar causes. Small-pox, which then seldom claimed less than its thousand victims a year, has now been robbed of all its terrors, and might, probably, if there were more prudence and less fanaticism abroad, be quite abolished. Plague is no longer a cause of death with us. Spotted fever and the purples visit us but rarely; and scurvy, which then killed its eighty or ninety a year, has wholly vanished.

“It will be obvious, too, to you that there are on the list many death-causes which, although they still remain, are far less operative now than then.

“If we add together the deaths from violent causes, we find that they amount to 178. This gives us one violent death in every 111 deaths.

“If we glance at the first return of the Registrar-General for the year 1837, we find that out of a total, for the latter half of the year, of 24,959 deaths, 580 were from violent causes. This gives us one violent death in every forty-three deaths.

“In the return for the year 1854 we find that (excluding deaths from cholera) there was one violent death to every thirty-five deaths.

“Thus we see that, whereas the general death-rate from disease has steadily decreased, the deaths from violent causes have increased in an undue proportion, and we are forced to reflect that railways, machinery, and lucifer-matches have been formidable opponents to the efforts made by the science of hygiene to lower the death-rate.

“In these bills of mortality there is a frequently-recurring cause of death—viz., ‘blasted’ and ‘planet-struck,’ and in one of them we find ‘apoplexy, blasted, and planet-struck’ grouped together, as though there was some relation between them. These facts, as well as the consideration of the immense mortality, make us appreciate the spirit in which was written that verse of the Litany:—‘From lightning and tempest; from plague, pestilence, and famine; from battle and murder, and from sudden death: Good Lord, deliver us.’ The nomenclature and classification of disease employed in these bills show us more plainly than could anything else the immense progress of medicine made since the dawn of science. The great mortality of these times was due in a small degree (at least, it is flattering to ourselves to think so), to the absence of anything like scientific medical knowledge. Mainly, however, it was due to faulty hygienic arrangements in the matter of *houses, food, water, and drainage.*



“With regard to the *houses*, the following letter of Erasmus tells its own tale, and needs no comment :—

“*Letter of Erasmus to Francis, Physician to the Cardinal of York, 1518 or 1519.*

“ ‘I often wonder and lament how it happens that for so many years Great Britain has been afflicted with pestilence without intermission, particularly with the sweating sickness, a malady which seems peculiar to itself. We read of a city being delivered from a pestilence which had long ravaged it by the destruction and renewal of its buildings, in accordance with the advice of some philosopher. Either I am greatly deceived, or by some such plan must England be delivered. In the first place, they never think whether their doors and windows face north, south, east, or west ; and, in the second place, the rooms are generally so constructed that, contrary to Galen’s rule, no thorough draught can be sent through them. Then they have a large part of the wall fitted with sheets of glass, which admit the light but keep out the air, and yet there are chinks through which they admit that filtered air, which is all the more pestilential because it has been lying there a long time. Then the floors are generally strewed with clay, and that covered with rushes, which are now and then renewed, but so as not to disturb the foundation, which sometimes remains for twenty years nursing a collection of spittle, vomits, excrements of dogs and human beings, spilt beer, and fishes’ bones, and other filth that I need not mention. From this, on any elevation of temperature, there is exhaled a vapour which, in my judgment, is by no means beneficial to the human constitution. Besides, England is not only surrounded on all sides by the sea, but many parts of it are very marshy, and it is intersected with salt rivers, to say nothing just now of the salt fish, of which the common people are wonderfully fond. I should have confidence in the island becoming more healthy if the use of rushes could be abolished, and the bedrooms so built as to be open to the sky on two or three sides, and if all the glass windows were so made as to open or shut all at once, and to shut so fast as to leave no chinks through which noxious winds could force a passage : since, as it is also sometimes healthy to admit the air, so is it sometimes healthy to exclude it. The vulgar laugh if you complain of their cloudy sky. I can only say, that for thirty years past, if I entered a room in which no one had been for some months, I would immediately begin to feel feverish. It would be an advantage if the vulgar could be persuaded to live more sparingly, and to be more moderate in the use of salt fish. Then there might be policemen, who should have the charge of seeing that the streets were kept clean from filth, and they should also look after the neighbourhood of the city. I know you will laugh at me for making myself anxious about these matters, but I do so out of friendship for a country which has so long afforded me hospitality, and where I would willingly spend the remainder of my life, if I could. I doubt not that you in your wisdom know far more about these things than I do, but I wished to mention them, in order that, if my judgment should accord with yours, you may commend them to the consideration of the leading men of the country : for these things used to be the care of monarchs. I would very gladly have written to his Reverence my Lord Cardinal, but I had neither time nor anything to say, and I know well how immersed he is in the affairs of State.’ ”

“As to the *diet* of our ancestors, we have abundant evidence that it was excessive in amount, and largely consisted of salted animal food. To this was due the constant presence of ‘scurvy’ as a death-cause; and there can be no doubt that an ill-nourished population like that of Old London was little able to resist the ravages of the various epidemics which worked such fearful havoc amongst it.

“Of the *water supply* of Old London I have been able to find very little reliable information. In a plan of Roman London, which is given in Mr. Walter Thornbury’s account of ‘Old and New London,’ several streams, tributaries of the Thames, are indicated. Langbourne, Sherbourne, and Walbrook were then *bonâ fide* rivulets, but now remain to us only in name. The Fleet river is called in the plan ‘the River of Wells,’ and with some show of justice, for on its banks were Bride-well, Clerkenwell, Sadler’s Wells, and Bagnigge Wells, as also the wells of St. Pancras. Into this river of wells flowed, from the westward, the *Old Bourne*, which we still have only in name as Holborn. This word *bourne*, which most certainly means brook, and is the same probably as the Scotch *burn*, is to be found also in the words Cranbourne, Tyburn, &c. It admits of no doubt that much of the water consumed by the inhabitants was taken direct from the brooks and from the Thames.

“If we may take the names of streets and districts as any indication, we may infer that there were other brooks and wells from which the inhabitants were supplied, as the names of Shoreditch, Houndsditch, Shadwell, Goswell, Chiswell, and Holywell seem to bear witness. Private wells were probably common, and were, one would suspect, to be found in most of the better class of houses.

“The earliest form of water-works were the conduits, which were apparently reservoirs set up in some of the most crowded parts of the town, and which received their supply from the water-sources on the neighbouring high ground.

“Timbs tells us that New Bond Street was, in 1760, an open field, called *Conduit Mead*, from one of the conduits which supplied this part of the town with water; and Conduit Street received its name for the same reason. Carew Mildmay, who died between 1780 and 1785, told Pennant that he remembered killing a woodcock on the site of Conduit Mead when it was open country.

“Spring water was formerly conveyed to public reservoirs in the city by leaden pipes from various sources in the suburbs—viz., from Tyburn in 1236, from High-bury in 1438, from Hackney in 1535, and from Hoxton in 1546.

“A drawing of the time of Charles I. shows a stone conduit in St. James’s Square.

“Lamb’s Conduit was founded in 1577 by William Lamb, citizen and cloth-worker. The conduit head was in the fields near the street which bears its name, and Ormond Street, whence the water flowed in pipes 2,000 yards long to the conduit on Snow Hill.

“Tyburn furnished nine conduits, and, with Bayswater, was viewed periodically by the Lord Mayor. In 1562 it is recorded that, on the occasion of viewing the conduits, they dined at the Banqueting House, which stood on the site of Stratford Place, and that they killed a hare before dinner and hunted a fox afterwards. At the south end of the Serpentine one may see the remains of the conduit head which supplied Westminster Palace.



“Mr. Thornbury gives us the following particulars concerning the conduits in Cheapside :—‘The great conduit of Cheapside stood in the middle of the east end of the street, near its junction with the Poultry, while the little conduit was at the west end, facing Foster Lane and Old Change. Stow, that indefatigable stitcher-together of old history, describes the larger conduit curtly as bringing sweet water “by pipes of lead underground from Tyburn for the service of the city.” It was castellated with stone and cisterned in lead about the year 1285; and again new-built and enlarged by Thomas Ham, a sheriff, in 1749.’ To these conduits repaired the water-carriers, ‘who were hired to supply the houses of the rich goldsmiths of Chepe, and who, before Sir Hugh Myddleton brought the New River to London, were indispensable to the citizens’ very existence.’ In the reign of Edward III. the supply of water for the city seems to have been derived chiefly from the river, the local conduits being probably insufficient. We read further that in the reign of Henry V. complaints were made by the poor that the brewers, who rented the Countains and chief upper pipe of the Cheapside Conduit, also drew from the smaller pipe below; and the brewers were warned that for every future offence they would be fined 6s. 8d. There is, I believe, still at Pentonville a house called the ‘White Conduit Tavern,’ which stands partly upon the site of a notable but not very reputable place of entertainment, called White Conduit House, which was much frequented by the citizens of London a century ago. There were the remains of an old stone conduit here as recently as 1831. It was built in the reign of Henry VI., and repaired in 1641. It supplied the Carthusian Friars, and afterwards the boys at the Charterhouse School. In 1654 the supply fell short, and a supply from the New River was decided on.

“The difficulty of supplying a sufficient quantity of water to the inhabitants by means of wells, conduits, and water-carriers, continued to increase until the year 1582, when Peter Morice, a Dutchman, undertook, as the inhabitants could not go to the Thames for the water, to carry the Thames to them. With this object he erected an ingenious pumping-engine in the first arch of London Bridge, worked by water-wheels, driven by the rise and fall of the tide, which then rushed with great velocity through the arches. This machine forced the water through leaden pipes, which were laid into the houses of the citizens; and the power with which Morice’s forcing-pumps worked was such that he was enabled to throw the water over St. Magnus’s steeple, greatly to the wonderment of the Mayor and Aldermen, who assembled to witness the experiment. The machinery succeeded so well that, a few years later, we find the Corporation empowering the same engineer to use the second arch of London Bridge for a similar purpose. The river-pumping leases continued in the family of the Morices until 1701, when the then owner sold his rights to Sir Richard Soams for £38,000, and by him they were afterwards transferred to the New River Company.—(Smiles’ ‘Lives of the Engineers,’ Vol. I.).

“There is no room to doubt that the water-supply was wretchedly bad; and since it is certain that these various bournes, wells, and ditches, as well as the Thames itself, received the drainage of the soil and the sewage of the inhabitants, we cannot wonder that when the germs of some of those diseases which we call zymotic, and which are capable of being disseminated by water as well as by other means, were

imported amongst the population, those zymotic maladies spread like wildfire, and proved disastrous, in the manner that we read the black death, the sweating sickness, and the plague were disastrous. Even the most wholesome water which the Londoners could obtain was conveyed, we read, from Tyburn in leaden pipes, and stored in a leaden cistern; and it would be curious to know how many of the inhabitants of Chepe suffered from attacks of colic or had blue lines upon the gums. It is true that the Thames, Kent, and Hertfordshire waters, with which London is supplied at present, seem incapable of acting upon lead, but of the power of the surface-water in the neighbourhood of London to dissolve lead we know little. It is at least possible that the heading ‘Griping in the guts,’ which is so common in the old bills of mortality, may have included some cases of lead-colic.

“The fact that, in the reign of Edward III.—a reign memorable for one of the most fearful pestilences that this or any other country has ever seen—the inhabitants apparently preferred to take their water directly from the river, renders it probable that the brooks and bournes had lost even then that coarse purity of which our senses can take cognisance. Walbrook, Oldbourne, and Langbourne, the very sites of which have passed away, were probably little better than open sewers, and had lost those characteristics which a wholesome brook should have—

“ ‘With here and there a lusty trout,  
And here and there a grayling;’

“The *drainage* of Old London consisted probably of cesspools and surface-drains; and the lines of Swift, in which he describes a city shower, coarse though they be, seem worthy of quotation, as giving a vivid picture of metropolitan hygiene, even as late as the reign of Queen Anne:—

“ ‘Now from all parts the swelling kennels flow,  
And bear their trophies with them as they go:  
Filt of all hues and odours seem to tell  
What street they sailed from by their sight and smell.  
They, as each torrent drives its rapid force,  
From Smithfield to St. Pulchre’s shape their course,  
And in huge confluence joined at Snow Hill ridge,  
Fall from the conduit prone to Holborn Bridge.  
Sweepings from butchers’ stalls—dung, guts, and blood—  
Drowned puppies, stinking sprats, all drenched in mud,  
Dead cats, and turnip-tops, come tumbling down the flood.’

“Since the great plague of 1665, London has not, happily, been visited by any pestilence of at all similar proportions. This is attributable to several facts, foremost among which is doubtless our improved knowledge of disease and its causes; and we must not forget that the epochs of these last great plagues were also the epochs in which flourished two such men as William Harvey and Thomas Sydenham. Froude (‘History of England,’ Vol. I., p. 61), speaking of the change that gradually came over the English nation at the period of the Reformation, says:—‘The paths trodden by the footsteps of ages were broken up; old things were passing away, and the



faith and the life of ten centuries were dissolving like a dream. Chivalry was dying, the abbey and the castle were soon together to crumble into ruins, and all the forms, desires, beliefs, convictions of the old world were passing away, never to return. A new continent had risen up beyond the western sea. The floor of heaven, inlaid with stars, had sunk back into an infinite abyss of immeasurable space, and the firm earth itself, unfixed from its foundations, was seen to be but a small atom in the awful vastness of the universe! In the fabric of habit which they had so laboriously built for themselves, mankind were to remain no longer.'

"Philosophers had begun to inquire methodically into the meaning of, and to seek for reasonable interpretations of, natural phenomena; and the science of medicine could not—as we know it did not—escape the influence of that general change of thought which was going on around it.

"Another cause of the improved health of the metropolis was the Great Fire of 1666, which destroyed upwards of 13,000 houses, many of them of the class which Erasmus had condemned, and which, there can be little doubt, were fever-dens of the worst description.

"The only writer who has had the hardihood to advocate the systematic use of fire as a purifier is an American. Nathaniel Hawthorne, in his well-known novel 'Transformation,' says, speaking of the old buildings so common in Italy:—

"Gazing at them, we recognise how undesirable it is to build the tabernacle of our brief life-time out of permanent materials, and with a view to their being occupied by future generations. All towns should be made capable of purification by fire, or by decay, within each half-century. Otherwise, they become the hereditary haunts of vermin and noisomeness, besides standing apart from the possibility of such improvements as are constantly introduced into the rest of man's contrivances and accommodations. It is beautiful, no doubt, and exceedingly satisfactory to some of our natural instincts, to imagine our far posterity dwelling under the same roof-tree as ourselves. Still, when people insist on building indestructible houses, they incur—or their children do—a misfortune analogous to that of the Sibyl when she obtained the grievous boon of immortality. So, we may build almost immortal habitations, it is true, but we cannot keep them from growing old, musty, and unwholesome, dreary, full of death-scents, ghosts, and murder-stains; in short, habitations such as one sees everywhere in Italy, be they hovels or palaces.'

"A third cause, and a cause which has not, I think, been sufficiently recognised, was the construction of water-works for bringing wholesome water to London.

"It is stated that, as early as the reign of Queen Elizabeth, leave was granted to the citizens to convey a stream to London from any part of Middlesex or Hertfordshire. It was not, however, till 1609 that Mr. Hugh Myddleton, a Welsh goldsmith, who had enriched himself by mines in Cardiganshire, persuaded the Common Council to transfer their powers to him, and he undertook in four years, at his own risk and charge, to bring the Chadwell and Amwell Springs from Hertfordshire to London by a route more than thirty-eight miles long. The scheme met with much opposition from the landholders of Middlesex and Hertfordshire, and before the work was completed the projector's resources were exhausted, and he was obliged to petition the king to assist him.



“The date of the opening of the New River Head at Clerkenwell was September 29, 1613. ‘It was a considerable time, however,’ says Thornbury, ‘before the New River water came into full use, and for the first nineteen years the annual profit scarcely amounted to twelve shillings a share.’

“Smiles computes the cost of the New River at £18,000. The pipes at first used were of wood. The leakage was so great through these wooden pipes that it is computed that about a quarter of the whole water was wasted. When these wooden pipes were in vogue—which we may be sure quickly rotted—it is no wonder that a prejudice existed against them. Water-carriers, therefore, long continued to drive a trade in water carried directly from the New River Head or the river itself, their cry being ‘Fresh and fair New River water! None of your Pipe Sludge!’ At the source of the New River at Chadwell, near Ware, a memorial stone has been erected, bearing the following inscription:—‘Sacred to the memory of Sir Hugh Myddleton, Baronet, whose successful care, assisted by the patronage of his king, conveyed this stream to London: an immortal work, since no man cannot more nearly imitate the Deity than in bestowing Health.’

“Besides the prevention of disease, one of the great aims of the science of public health is, or most undoubtedly ought to be, the improvement of the race. We have only to look at the children—pale, wretched, pinched, crooked-limbed, and fighting with disease—who swarm in the London streets, and compare them with the sturdy, rosy-cheeked boys and girls that one encounters in well-cared-for country districts, to be sure that the town-bred children of the poor whose resources are not sufficient to counteract the adverse surroundings which encompass them, must be vastly inferior as citizens—physically as well as morally—to the children who enjoy from their birth all the advantages of fresh air, free exercise, and healthy parentage.

“The theory of ‘natural selection,’ broached a few years since, ought certainly to have a great influence upon the science of public health, and upon the enactments which may be necessary for the forwarding of that science. According to the theories of natural selection, the weak members of a family are sure to be worsted in the battle of life, and the strong will alone survive the struggle and bear off the rewards of victory. In this way the gradual improvement of the race is insured by the eradication of the weeds and the giving of more room for the healthy plants to flourish in.

“Now, the science of public health must have the effect, and doubtless has had the effect, of lessening the enemies with which man has to contend, and thus there can be no doubt that many more sickly weeds survive to manhood than formerly; and, therefore, against the great good which public health enactments doubtlessly effect for us, must be placed the counter-balancing reflection that excessive protection interferes with that process which bears good fruit in the long run—I mean ‘natural selection.’

“‘To Plato,’ says Lord Macaulay, ‘the science of medicine appeared to be of very disputable advantage. He did not, indeed, object to quick cures for acute disorders, or for injuries produced by accidents; but the art which resists the slow sap of a chronic disease, which repairs frames enervated by lust, swollen by gluttony, or inflamed by wine—which encourages sensuality by mitigating the natural

punishment of the sensualist, and prolongs existence when the intellect has ceased to retain its entire energy—had no share of his esteem.’ ‘The exercise of the art of medicine ought, he said, to be tolerated so far as that art may serve to cure the occasional distempers of men whose constitutions are good. As to those who have bad constitutions, let them die ; and the sooner the better.’

“If this Platonian doctrine were acted upon, there can be little doubt that the remnant of the present population which would remain would be a remnant having robust constitutions, and therefore calculated to transmit strength and stamina to the generations which should succeed them.

“In centuries gone by the elimination of the physically, mentally, or morally weak was more abundantly effected than at present. All the diseases bred of ignorance and overcrowding assailed the population in the most virulent manner ; and perhaps I shall not be thought wanting in respect to the mighty dead if I put forward a doubt as to whether the treatment of the physicians of that time, with their antiphlogistics, bleedings, purgings, hot regimens, and barbarous nostrums, had even the merit of doing no harm. It must have been very seldom that the prescriptions and remedies ran counter to the ideas of Plato by repairing the enervated frame or resisting the slow sap of a chronic disease.

“The mentally weak were eliminated in the same way. In those dark ages a man who became mentally deranged was regarded from different points of view, according to the form which his derangement took. .

“‘If,’ says Dr. Maudsley, ‘the ravings of the person took a religious turn, and his life was a fanatical practice of some extraordinary penance . . . he was thought to have reached the ideal of human excellence, and was canonised as a saint ; more often his state was deemed to be a possession of the devil or other evil spirit, or the degrading effect of a soul enslaved by sin. . . . It was the natural result of such views of madness that men should treat him whom they believed to have a devil in him as they would have treated the devil could they have had the good fortune to lay hold of him. When he was not put to death as a heretic or a criminal, he was confined in a dungeon, where he lay chained on straw ; his food was thrown in, and his straw raked out through the bars ; sight-seers went to see him as they went to see the wild beasts—for amusement ; he was cowed by the whip or other instrument of punishment, and was more neglected and worse treated than if he had been a wild beast. Many insane persons, too, were, without doubt, executed as witches, or as persons who had, through witchcraft, entered into compact with Satan.’ In this way, the insane were quickly or slowly, but nevertheless surely, to a great extent eliminated from the ranks of the people.

“The elimination of the morally depraved was effected in a no less thorough manner. By an Act of Henry VIII. it was enacted that vagrants, beggars, and such as could give no good account of themselves, should suffer as follows :—

“If caught begging once, being neither aged nor infirm, he was whipped at the cart’s tail. If caught a second time, his ear was slit or bored through with a hot iron. If caught a third time, being thereby proved to be of no use on this earth, but to live upon it only to his own hurt and to that of others, he suffered death as a felon.



“Thieves, when convicted, were generally sentenced to death, and the sentence was not infrequently carried out; and although Mr. Froude discredits the assertion which has been made that as many as 72,000 criminals were executed in the reign of Henry VIII., there can be no doubt that the numbers of such executions was enormously great. Thus we see that disease, the State, and the gallows were great eliminators of worthless characters; and although, through these, as well as other—and probably more important—causes, the population remained numerically almost at a standstill, there can be no doubt that the race who conquered the Spanish Armada, and which produced a Shakespeare, a Raleigh, a Drake, and a Bacon, was a race which had approached to no mean degree of physical and mental excellence, and that, too, almost without the aid of sanitary legislation or compulsory education.

“The nineteenth century differs from the sixteenth in this—that it is far more benevolent in its treatment of the sick and erring. At the last census in 1871 it was found that of the 3,250,000 persons inhabiting the metropolis, no less than 60,000 were living as the inhabitants of workhouses, hospitals, asylums, and prisons, at the expense of the rest.

“We cherish our weeds. The patient with mental disease is allowed to go abroad as soon as the solicitous care of the physician has restored to him his reason; the hardest and most inveterate scoundrels in our prisons are often set at liberty with a ticket of leave; prostitutes are still permitted, except in a few favoured localities, to ply their calling and disseminate disease without restraint; and it is hardly too much to say that the hangman’s office has become a sinecure. We adopt the same tactics with mental and moral diseases as we do with physical maladies, and in our treatment of them we are actuated by the feeling that prevention is better than cure. And so indeed it is; and no one will deny that, for all concerned—the healthy as well as the sick and erring—the less harsh we are in the treatment of our unfortunate brethren, the better. It is certainly more rational, more humane, and more in accordance with Christian doctrine, to prevent than to be ready to adopt capital measures for eradication.

“The only objection which can be raised against our humane course of action arises from the knowledge that much disease, both of mind and body, is hereditary; and when we reflect that the consumptive when he leaves the hospital, the madman when he quits the asylum, and the habitual criminal when he gets his discharge or ticket of leave, are all capable of transmitting their several taints to generations yet unborn, we can hardly repress the doubt which arises in our minds as to whether Plato was not in the right after all.

“‘All persons,’ says Dr. Maudsley, ‘who have made criminals their study, recognise a distinct criminal class of beings, who herd together in our large cities in a thieves’ quarter, giving themselves up to intemperance, rioting in debauchery, without regard to marriage ties or the bars of consanguinity, and propagating a criminal population of debauched beings. . . . In addition to the perversion or entire absence of moral sense, which experience of habitual criminals brings prominently out, other important facts disclosed by the investigation of their family histories are, that a considerable proportion of them are weak-minded or epileptic, or become insane, or that they spring from families in which insanity, epilepsy, or



some other neurosis exists, and that the diseases from which they suffer and of which they die are chiefly tubercular diseases and diseases of the nervous system. Crime is a sort of outlet, in which their unsound tendencies are discharged; they would go mad if they were not criminals, and they do not go mad because they are criminals.'

"The State has so much respect for the liberty of the subject that one can hardly expect that any measures will ever be taken to prevent the marriage of those tainted with hereditary sickness, or to stop the propagating power of habitual criminals.

"The only check which we have as yet attempted to place upon certain of the evils last enumerated—the evil of unrestrained marriage between people who are physically or mentally deranged; the evil of allowing habitual criminals to wander among us and perpetuate their degraded class—is the moral check. We have got a compulsory Education Act, and, if evasion of it be prevented, we may hope that, within sixty years or so from the present date, every British subject will possess the means of educating himself if he choose—*i.e.*, a knowledge of reading, writing, and a little arithmetic.

"Besides the Education Act, which there can be no doubt will do much to develop the mental and moral excellence of the nation, there are other means of improving the national health which surely ought not to be neglected. Perfect health, we are told, consists of 'a sound mind in a sound body'—*Mens sana in corpore sano*. The ideas of the ancients, that body and mind were distinct and separable from each other, have long since exploded, and, according to modern views, a sound mind is merely the outcome of a perfectly sound body. If, therefore, we are to have a national system of mental training, surely we ought to have a national system of physical training as well. For us, whose masses are for the most part centred in densely-populated and unhealthy cities, this physical training seems doubly important. In the early days of our history, when the feudal system still existed among us, every able-bodied man in the country was trained to bear arms; and although there was no standing army, no class who made fighting their sole profession, and physical training their principal aim in life, we were then dreaded by our foes, and rightly regarded as the fiercest nation in the world. In whatever way the physical training is to be effected—whether by a term of compulsory military or naval service, or otherwise—there can be no doubt that it is absolutely necessary; and if it be not carried out, and *with women as well as with men*, we shall undergo a great risk of physical deterioration, because a large proportion of the inhabitants of our cities are wholly unable to receive physical training in any shape except upon compulsion and at the expense of the State."

#### FOOD.

The human body has often been spoken of as a machine, and it will perhaps help us to bring graphically under the reader's notice the relation existing between the human machine and the food which keeps it going, if we push the analogy a little, and ascertain how far this similarity is recognisable.

A steam-engine consists of a collection of skilfully-devised metal cranks and levers, which are the instruments for guiding the power generated in it in the desired directions. These cranks and levers, if properly oiled, undergo an amount of wasting which is surprisingly small in proportion to the work which they accomplish. They do waste, however, and repairing is part of the life history of every steam-engine. A steam-engine has also a furnace for the production of heat, and a boiler in which the heat is transformed into motor power. In the human machine the stomach is analogous to the stoke-hole of the engine, but the process of combustion goes on, not only in the furnace proper, but in every part of the body to which the dissolved food is carried by the blood vessels. The burning of food in the human economy is in some degree analogous to the consumption of fuel in a fire, the main difference between them being that in the one case it is rapid and visible and in the other case very slow and recognisable only by its effects. Now, the work done by a steam-engine is exactly in proportion to the amount of fuel consumed, and so it is with the body, for it is a well-known fact that hunger is exactly in proportion to occupation or labour. In the present chapter we shall endeavour to demonstrate, with all the clearness which the present state of our knowledge will allow, how best to keep the human machine at work, and what are the proper fuels, or foods, with which to supply it.

Foods are divisible into four classes; these are called, 1, Albuminates; 2, Fats; 3, Carbo-hydrates; 4, Water and Salts.

1. *Albuminates*.—This class includes all those foods which contain albumen. Albumen, in its purest form, is met with in the whites of eggs. It is a straw-coloured, transparent, tenacious, viscid fluid. It is soluble in water, and becomes solid, or “coagulates,” when mixed with certain acids and other chemical re-agents, or when heated above a certain temperature. The temperature at which albumen coagulates is 180° Fahr. A boiling temperature—i.e., 212°—of course coagulates it all the quicker. Now albumen, although found in its purest form in eggs, constitutes, it must be remembered, a large proportion of all animal foods, and although fats contain no albuminous principle, the lean parts of meat are scarcely less albuminous than eggs themselves. All other animal tissues also contain albumen, and those which contain the least, such as bones and ligaments, are rich in a principle which is nitrogenous, like albumen, and is called gelatin.

The chief use of the albuminates is for the nourishment of the albuminous tissues of the body. They also constitute one of the chief sources of fat.

The albuminates are often spoken of as the nitrogenous food principles because of the large proportion of nitrogen which they contain. They are also called the protein principles. They are found in greatest abundance in the animal kingdom, but it would be a mistake to suppose that they are not found in the vegetable world also. Many vegetables are very rich in nitrogenous matter, and the seeds of the leguminous plants, such as peas and beans, are a well-recognised source of albuminous food. Almost all vegetable bodies contain more or less albuminous matter, and in very many it is the preponderating ingredient. It is a popular error to suppose that a vegetable diet is incapable of maintaining the strength and stamina of a man, and it should be borne in mind



that in the Franco-Prussian war of 1871, the German army was fed to a great extent on a sausage which was largely composed of pea-meal.

2. *Fats*.—These bodies are found in both the animal and the vegetable kingdoms. It is only necessary to mention the fat of meat, the butter which we get from milk, and which is almost pure fat, and the valuable oils which are expressed from the olive and other fruits and seeds, to convince the reader of the truth of this assertion. If we are guided by anthropological considerations, it would seem that the fats are chiefly useful in maintaining the heat of the body, for it is well known that the inhabitants of northern and cold climates are accustomed to consume enormous quantities of fatty material. The tallow-eaters of Russia, and the blubber-eaters of the Arctic regions, are familiar examples of this practical and scientific truth. Fats are of various kinds, and between the perfectly fluid oil of the olive and the hard dense wax secreted by the bee there are all degrees of hardness, softness, and fluidity.

3. *Carbo-hydrates*.—These are dietetic principles, into which the two chemical elements, carbon and hydrogen, mainly enter. The types of this group are sugar and starch, and it is a peculiarity of this group that it is limited almost entirely to the vegetable kingdom. All vegetables, with very few exceptions, contain starch. The cereals are mainly composed of starchy matter, but by no means entirely so, for even in the most starchy of them there is a fair proportion of nitrogenous matter and salts. Wheaten flour, rice, maize, arrowroot, tapioca, and potatoes owe the chief of their nutrient qualities to the starchy material which they contain. Some vegetables are very rich in sugar, and it will only be necessary to mention the sugar-cane, the beet-root, and the ripe fruits, such as the grape, the apricot, the gooseberry, and the plum, to bring this fact prominently under the reader's attention. The use of the carbo-hydrates is chiefly to generate force and heat. It is true, no doubt, that heat is always convertible into motion almost at will, and that all heat-producers are necessarily producers of motion also, but it is impossible not to feel that the inference is justifiable that the fats are probably most useful as mere producers of heat, judging from the fact of their large consumption by the not very energetic inhabitants of the polar regions, and that the carbo-hydrates are most useful as generators of motor force, if we may judge by the stupendous feats of running and endurance in other forms which the inhabitants of the tropics can perform on a diet of which rice is almost the sole constituent. It would be dangerous, however, to argue from premises such as these, and the supposition which we have put forward as likely is very far indeed from being proved. It is certain that a man who consumes large quantities of carbo-hydrates in addition to albuminates is very liable to grow fat.

4. *Water and Salts*.—The human body is mainly composed of water, and therefore it is that water is necessary in our food. We take very much more water, indeed, than most of us are aware of. Absolutely dry food can be taken in only very small quantities, and we all know the labour and sorrow of trying to eat too large a quantity of biscuit, or other form of perfectly dry food, without drinking. All our food is in fact very largely composed of water, and if meat be perfectly freed from its water, it is surprising to see how greatly its bulk is diminished.

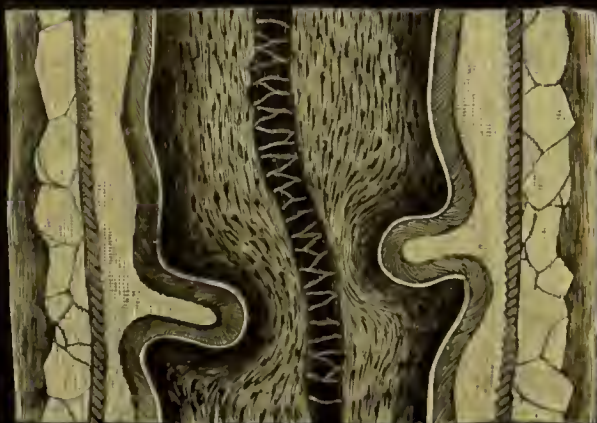




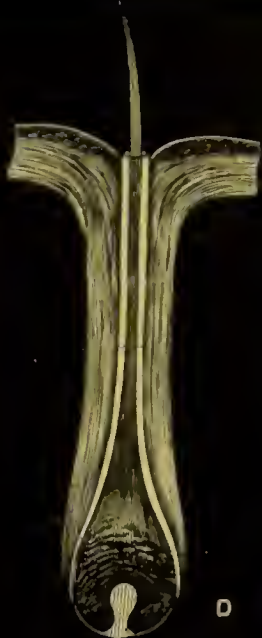
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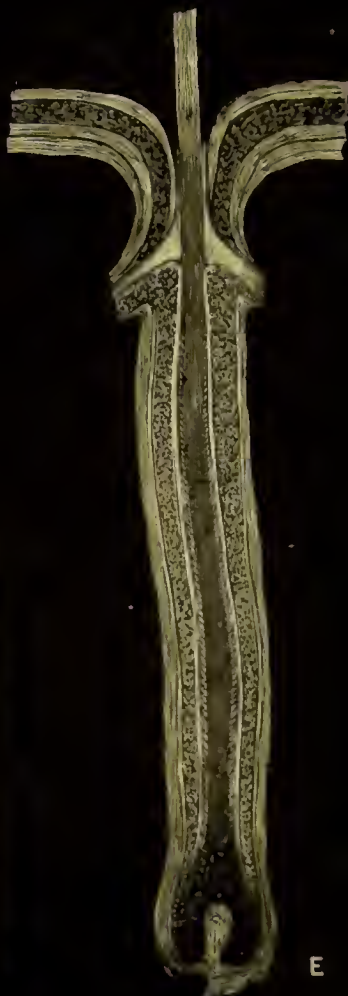
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C



D



E

## HUMAN HAIR (MAGNIFIED).

- A. Section of the skin of the head with hair follicles. (*From Kölliker.*)
- B. Root of hair. (*From Rohrbäusch.*)
- C. Portion of root of dark hair, magnified 250 times. (*From Kölliker.*)
- D. Hair follicle from the eyebrow, with hair just erupted. (*After Kölliker.*)
- E. Hair and hair follicle, magnified 50 times. (*From Kölliker.*)



Vegetables contain enormous quantities of water, and some of them, such as turnips, really contain only a small percentage of anything else. Salts, *i.e.*, mineral matter in a state of solution, are universally present in all foods, and they are so abundant in the body, that it is only reasonable to suppose that they are indispensable articles of diet. The principal salts in the body are, common salt, or chloride of sodium, salts of potash, salts of lime, salts of iron, and others of less importance.

5. *Condiments*.—It is sometimes customary to make a fifth class of alimentary substances, and to include in it all those bodies which we use as condiments, such as pepper, mustard, tea, coffee, and alcohol. Although these bodies cannot be regarded as having any great, if indeed they have any true, nutrient power, they must, nevertheless, be looked upon as absolutely indispensable for our well being, and the fact that all nations use them in some form must be taken as conclusive evidence of their indispensability.

With regard to the five classes of alimentary principles which we have enumerated, there is one point concerning which there are still some doubts. It is this: To what extent are the fats and the carbo-hydrates interchangeable?—that they are interchangeable to a great extent is proved beyond a doubt by the common experience of mankind. Thus voyagers have lived for long periods on meat alone, containing its proper quantum of fat and salts, without any serious interference with health. Again, it is well known that many tropical races manage to subsist on a vegetable diet containing a large proportion of carbo-hydrates, but almost free from fat.

People who consume much starch or sugar are liable to grow fat, and exact experiment has shown that the pig when nourished entirely upon albuminates and carbo-hydrates is capable of producing an undiminished amount of fat. Bees too, when fed entirely on sugar, are capable of making wax. These facts prove that at all events fatty matters are, in the animal economy, entirely producible from the carbo-hydrates, and to a less extent from the albuminates, but the universal custom of mankind shows us that the body thrives best on diets in which the carbo-hydrates, fats, and albuminates are all represented. Dr. Parkes has the following remarks on this interesting subject: "An argument against the fats and carbo-hydrates being mutually replaceable under ordinary conditions in the diet of man is drawn from a consideration of the diets used by all nations. In no case in which it can be obtained is an admixture of starch, in some form, with fat omitted; moreover, in all cases—except in those nations like the Esquimaux, who are under particular conditions of food—we find the amount of fat taken is comparatively small as compared with the starches. Why should this be, if the two groups serve virtually the same end? Is it a matter of chance that Nature has everywhere mixed up fat and carbo-hydrates in those foods on which men thrive best, or is it this mixture which has aided in making men what they are? Analyse almost all the known diets of the world which are not, so to speak, diets of necessity, and they consist—besides water and salts—of nitrogenous substances, fat, and starches. If the two latter are convertible why should we not find in some places diets of albuminates and fat only; in others of albuminates and starches only? Why should there be this singular uniformity of combination? Why also should all nations so eagerly seek



after starches and sugars, even when fats are available, so that it seems almost an instinct to desire them ?”

It has been clearly demonstrated over and over again that man cannot live on a diet composed of any one of the alimentary principles. Whenever the attempt has been made to support life on any one of them, such as albumen alone, or sugar or starch alone, or simple gelatine, the result has been a practical starvation. Dr. Hammond managed to support life for ten days on a diet composed entirely of albumen, derived from bullock’s blood, and water. Symptoms of a most alarming kind soon showed themselves, and at the end of ten days he was obliged to desist. Attempts of a less rigid kind also terminated in a similar way ; and in those cases where life has been supported entirely upon lean meat or upon cheese, the health has very quickly deteriorated. In some conditions of the constitution, such as diabetes, it becomes necessary to deprive the patient of carbo-hydrates, because of his inability to assimilate them, and only those who have themselves suffered, or have closely watched the sufferings of others, can be aware of the misery which a restricted diet of this kind entails on the sufferer, and the terrible longing for the forbidden food.

In the early days of his existence man is dependent entirely on one article of diet, viz., milk, and it is a remarkable and most instructive fact that milk contains an admixture of all the alimentary principles we have enumerated—the albuminates, carbo-hydrates, fat, water, and salts. Milk may, therefore, be regarded as a typical food.

If milk be allowed to stand the cream rises to the top, and may be skimmed off. This is the fatty constituent of milk.

If to the skimmed milk some rennet be added the casein will coagulate, and can be separated as curd. This is the albuminate, or nitrogenous constituent of milk.

The fluid which is left after the coagulation of the casein, and which is known as whey, contains the sugar of milk or lactic acid, which is the carbo-hydrate constituent, as well as the salts and most of the water.

Roughly speaking, therefore, butter is almost pure fat, cheese is almost purely albuminous, and whey is the vehicle of the sugar and salts.

An analysis of milk shows that in a hundred parts there are—of

Water	.	.	.	.	.	.	86.7 parts.
Albuminates	.	.	.	.	.	.	4.0 „
Fats	.	.	.	.	.	.	3.7 „
Carbo-hydrates	.	.	.	.	.	.	5.0 „
Salts	.	.	.	.	.	.	0.6 „
Total	.	.	.	.	.	.	100 „

As a food, milk is perhaps rather rich in albuminate constituents, but it must be borne in mind that it is the food *par excellence* of the period of greatest growth; and that the albuminates are particularly useful for the formation of tissue.

We have clearly shown that the diet to maintain health must be mixed. We now pass on to consider how much food a man requires in the twenty-four hours. It is a question which can only be answered by experience, since it is well known

that what will satisfy one man of a certain bulk will not be sufficient for another of similar size. Experiments as exact as circumstances will permit have been made on this point, since it is of the greatest importance to know in those cases where it is not possible to allow every man to be guided by his appetite, as in the army, in prisons, and other public institutions, what is a fairly sufficient diet to maintain health in men of average weight and stature. In actual practice many considerations forbid us to be exact in these matters. Age, for instance, has a more evident effect on the food requirements than any other single consideration. No one is able to gauge the appetite of a growing school-boy fond of athletic sports, in whom the demands of growth and the demands of exercise equally cry out for attention; while the lean and slippered pantaloon who spends his existence in dozing by the fire, and whose tissues are waning rather than waxing, requires, comparatively speaking, a very small amount of food to maintain life at his low level.

General experience has decided that the standard water-free diet for a man of average size doing an average amount of work is as under:—

STANDARD WATER-FREE DIET.					
Albuminates	.	.	.	.	4.5 ounces.
Fats	.	.	.	.	3.0 "
Carbo-hydrates	.	.	.	.	14.0 "
Salts	.	.	.	.	1.0 "
Total	.	.	.	.	22.5 "

Almost all food contains water, and usually this water is in considerable quantity, constituting about half the weight of the foods, so that it may be said that every man requires about forty ounces of ordinary food per diem.

But it will be urged by the unscientific reader, I am not a chemist, and what is the use of talking to me of exact quantities of fats, albuminates, and carbo-hydrates, when I am quite ignorant of the methods for determining these quantities? We therefore subjoin a tabular statement of the percentage composition of some of the commonest foods.

PERCENTAGE COMPOSITION OF FOODS.

	WATER.	ALBUMINATES.	FATS.	CARB.-HYD.	SALTS.
Milk . . . . .	86.7	4.0	3.7	5.0	0.6
Raw Meat . . . . .	75.0	15.0	8.4	...	1.6
Roast Meat . . . . .	54.0	27.6	15.45	...	2.95
Egg . . . . .	73.5	13.5	11.6	...	1.0
Butter . . . . .	6.0	0.3	91.0	...	2.7
Cheese . . . . .	36.8	33.5	24.3	...	5.4
Wheat Flour . . . . .	15.0	11.0	2.0	70.3	1.7
Bread . . . . .	40.0	8.0	1.5	49.2	1.3
Rice . . . . .	10.0	5.0	0.8	83.2	0.5
Potatoes . . . . .	74.0	1.5	0.1	23.4	01.0
Oatmeal . . . . .	12.0	16.0	6.8	63.2	2.0
Peas (dry) . . . . .	15.0	22.0	2.0	53.0	2.4
Sugar . . . . .	3.0	...	...	96.5	0.5



Looking at this table, we can see at a glance the predominating principles in any article of diet. It will be observed that among the animal foods the group of carbo-hydrates have no place except in milk. Milk, it must be remembered, differs from other animal foods in this, that it is obtained from the living animal, and not from the dead, and it is certainly a wonderful instance of the design of Providence that this transient tissue, intended for the nourishment of the young, should differ from all other animal tissues in containing that which is essential for the proper nourishment of the growing animal.

There is a way of regarding food which has lately come much into fashion, as it were, among scientific men. This is to look upon all food from a purely chemical aspect, as so much fuel which is to be burnt up in the human furnace. This point is well given by Dr. Edward Smith, in his work on "Foods."

"Food is required by the body for the two chief purposes, viz., to generate heat and to produce and maintain the structures under the influence of life and exertion. The importance of the latter is the more important since wasting of the body is familiarly associated with decay of life; but the former is so much the more urgent that whereas the body may waste for a lengthened period and yet live, it rapidly dies when the source of heat is removed, or even greatly lessened.

"The production of heat in the body, so wonderful in the process and amount, results only from the chemical combination of the elements of food, whether on the minute scale of the atoms of the several tissues, or on the larger one connected with respiration, and is thence called the combustion of food. As familiar illustrations of the production of heat from chemical change, we may mention that when cold oil of vitriol and cold water are added together the mixture becomes so hot that the hand cannot bear it; and the heating of haystacks, and also of barley in the process of malting, are well known. This action in the body is not restricted to changes in one element alone, but proceeds with all; yet it is chiefly due to a combination of three bodies, viz., oxygen, hydrogen, and carbon, and requires for its support fat, starch, or sugar, or other digestible food composed of those substances, precisely as coal or wood supply fuel for fire without the body.

"This effect is made extremely striking by Professor Frankland, in the following table, which shows the amount of heat generated from so small a quantity as ten grains of certain foods, during their complete combustion within the body, and the force which scientific calculations have shown to be equivalent to that amount of heat. The original quantity used by Professor Frankland has been reduced by Dr. Letheby to ten grains, for the convenience of English readers:—

FOOD.	The Combustion raises lbs. of Water 1 deg. Fahrenheit.	Which is equal to lifting lbs. 1 foot high.
10 grains of Dry Flesh . . .	13·12	10·128
"    "    Albumen . . .	12·85	9·920
"    "    Lump Sugar . . .	8·61	6·647
"    "    Arrowroot . . .	10·06	7·766
"    "    Butter . . . . .	18·68	14·421
"    "    Beef-fat . . . . .	20·91	16·142



“Thus we prove that an ounce of fresh lean meat, if entirely burnt in the body, would produce heat sufficient to raise about seventy pounds of water 1° Fahr., or a gallon of water about 7° Fahr. In like manner one ounce of fresh butter would produce ten times that amount of heat; but, it must be added, that as the combustion which is effected within the body is not always complete, the actual effect is less than that now indicated.”

The three great objects of food, then, are: 1, to furnish heat; 2, to produce force; 3, to encourage growth and prevent waste. It has been a great deal too much the custom to look upon meat as the only food which is really nourishing and worth eating. The English have held this erroneous doctrine for centuries, and if we look at the old bills of fare of the feasts given by kings and great people, it is simply astounding to see how the diet was composed almost entirely of animal food; fish and flesh in enormous quantities, and almost every bird that flew, were required for the furnishing of the rich man's table. Bread they had, of a coarse kind, but vegetables were remarkable for their almost entire absence. The potato had not been introduced, and green vegetables were scarce and dear. Those who were rich enough to feed on fresh meat did not, perhaps, materially suffer; but the poor, whose entire diet almost consisted of salted fish and meat, were liable to a frightful extent to those diseases which arise from improper feeding, and of which we shall speak at greater length later on. Notwithstanding that in the present day vegetables are cheap and plentiful in England, and that for the rich the vegetable produce of almost the entire world may be said to be easily obtainable, we still cling to the old dietetic traditions of our ancestors, and both rich and poor still continue to eat a diet which is not so much composed of vegetable articles as, both on the score of health and economy, it might be.

If we go to dine with a very rich man, or a city company, or other public body, who constitute themselves the guardians of old English hospitality, what do we get to eat? If it is in the winter or autumn we may begin with six oysters, which are almost entirely composed of albuminates; then perhaps comes the turtle soup, which chemically is a pleasant decoction of albumen and gelatine, and it is remarkable that a gourmand who would discharge his cook for leaving a few drops of fat upon the surface of any ordinary soup, takes with his turtle huge quivering lumps of green and yellow fat, such as only the educated palate can tolerate and the strongest stomachs manage to digest, even with the help of cold punch and cayenne pepper. It is probable that in these first two courses sufficient nitrogen has been served to satisfy the requirements of the system; but see what follows, turbot and lobster sauce very likely, which again is almost purely albuminate. Then come the entrées, which are perhaps three in number, and consist (we quote from an actual *menu*) of *crème de volaille aux truffes*, or, in other words, purée of chicken with truffles; mutton cutlets, with which one may or may not get a potato; and *chaud-froid de caille*, which consists of cold quails encased in cold meat jelly. Here again, then, in the entrées we are confronted with the almost exclusive use of the albuminates. Next, we proceed to the joint, which is a slice of pure roast meat, and with it one gets, for a certainty, some potato and green vegetable, and perhaps some salad. Then will follow a bird of some kind—grouse, partridge, pheasant,

wild duck, guinea fowl, according to season, or perhaps some greater delicacy, such as quail, or ortolan. With many of these birds it is considered little short of sinful to eat any vegetable, and with others there is served, at most, a few bread raspings, or a little bread sauce. Then come the sweets; and it is remarkable that even these are composed very largely of gelatine, and at most houses one finds the jellies in the ascendancy when compared with the sweets composed mainly of starchy matter and fruit. Cheese in some form brings the typical English banquet to a close. If a reference be made to the standard diet, it will be seen that the albuminates should form one-fifth part of the total food, but in the *menu* we have supposed, and which is scarcely exaggerated, it will be observed that the albuminates constitute the major part of the dinner. This is of course quite wrong, and it is not to be wondered at that those misguided possessors of wealth who indulge almost daily in repasts of this kind should suffer from gout, dyspepsia, and derangements of the liver, and be compelled to fly to Homburg, or Carlsbad, or Buxton, Cheltenham, or Bath, to try the experiment of undoing that which has been brought about by gluttony, or ignorance, or both.

That "they manage these things better in France," is undoubtedly true, and the quiet contemplation of the *menu* of the *table d'hôte* of any first-rate Continental hotel will generally convince the reader that there is not only art, but science too, in French cookery. In almost all the soups we find on the Continent, vegetables or starch are an important constituent. The soup itself is never too rich, and in it there is tapioca, or sliced vegetables, or vermicelli, or Italian pastes of some other kind. The fish is almost invariably served with vegetable and butter. The same remark applies to the entrées, and in them we find large quantities of vegetable of some kind, in fact, the meat may be said to flavour the vegetables rather than the converse. No French dinner is ever served, we believe, without one, and sometimes two, purely vegetable courses. French beans, asparagus, potatoes, or cauliflowers, are cooked in a variety of enticing ways, and always constitute an important feature in the dinner. Then again, the management of the sweets, as they are called, shows a proper regard to the requirements of the body. Instead of being mainly albuminous, they consist of compôtes of fruit, or slices of cakes with preserves. Justly celebrated as the French are for their pre-eminence in the culinary art, it must be admitted that they are far behind the Austrians and Italians as pastry-cooks. A really good cook should possess a French knowledge of savoury dishes, and an Austrian or Italian knowledge of sweets.

Mr. Buckmaster has lately been doing good service by insisting on a more liberal use of vegetables in the diet of the people, and we have been at some pains to show that the fault lies very greatly with the rich, who fail to give their poorer brethren the benefit of a good example.

In the middle ages the science of proper dietary was very little understood, and indeed the art of husbandry was in such a backward state that there was no choice, especially among the poor, except to be ill-fed. In those days, the English, who ate large quantities of fresh meat, were considered, and rightly so it would seem, the best nourished nation in Europe. Froude, in his "History of England," says:—"In the fifteenth century, and previous to it, the English were noted for their liberal diet



One of the Spanish nobles who came into England with Philip remarked, 'These English have their houses made of sticks and dirt, but they fare commonly so well as the king.' The relative numbers of the French and English armies which fought at Cressy, and Poitiers, and Agincourt may have been exaggerated, but no allowance for exaggeration will affect the greatness of these exploits; and in the stories of authentic actions under Henry the Eighth, where the accuracy of the account is undeniable, no disparity of force made Englishmen shrink from enemies wherever they could meet them. . . . Invariably, by friend and enemy alike, the English are described as the fiercest nation in all Europe—'the English wild beasts,' Benvenuto Cellini calls them; and this great physical power they owed to the profuse abundance in which they lived, and to the soldier's training to which every man of them was bred from childhood."

The amount of food which a man requires varies with a great number of circumstances. The chief of these is necessarily the amount of work which he is called upon to perform; in sickness and convalescence, when the only work done by the body is that internal work which is necessary to keep the heart, lungs, and other internal organs in action, the amount of food which is required is very small indeed. Dr. Playfair states that a man can be kept alive on two ounces of albuminates; twelve ounces of carbo-hydrates, and half an ounce each of fats and salts. This is called a subsistence diet, and it is sufficient for the internal work, but on it a man will lose weight.

In the English convict establishments the diets are calculated with the greatest scientific accuracy according to the amount of work which the convict is called upon to perform.

	HARD LABOUR DIET.	Per diem.
Albuminates . . . . .	. . . . .	4·075
Fat . . . . .	. . . . .	1·557
Carbo-hydrates . . . . .	. . . . .	18·806
Salts . . . . .	. . . . .	1·963

The "dynamic value," *i.e.*, the amount of work which this diet is capable of effecting by its combustion is calculated at 4,072 foot-tons, or is capable of raising 4,072 tons one foot high.

	LIGHT LABOUR DIET.	Per diem.
Albuminates . . . . .	. . . . .	3·508
Fats . . . . .	. . . . .	1·315
Carbo-hydrates . . . . .	. . . . .	16·727
Salts . . . . .	. . . . .	1·715

Dynamic value, 3,577 foot-tons.

	INDUSTRIAL EMPLOYMENT DIET.	Per diem.
Albuminates . . . . .	. . . . .	3·710
Fats . . . . .	. . . . .	1·562
Carbo-hydrates . . . . .	. . . . .	17·510
Salts . . . . .	. . . . .	1·616

Dynamic value, 3,787 foot-tons.

	PENAL DIET	Per diem.
Albuminates . . . . .	. . . . .	3·784
Fats . . . . .	. . . . .	1·580
Carbo-hydrates . . . . .	. . . . .	19·864
Salts . . . . .	. . . . .	0·972

Dynamic value, 4,193 foot-tons.



	PUNISHMENT DIET.	Per diem.
Albuminates . . . . .	.	1.296
Fats . . . . .	.	0.256
Carbo-hydrates . . . . .	.	8.160
Salts . . . . .	.	0.368
Dynamic value, 1,541 foot-tons.		

It may be assumed that the diet last quoted is not more than sufficient to sustain life when no work is being done. There are some remarkable histories on record of persons who have managed to live on incredibly small quantities of food. The Welsh fasting girl will occur to most of our readers, for although there can be little doubt that her parents were guilty of the grossest deception in the matter, still it is evident that the girl herself must have managed to exist on very little food indeed. Dr. Pavy, in his work on food, quotes the case of Thomas Wood, the miller, of Billericay, reported to the College of Physicians in 1767 by Sir George Baker, in which a remarkable degree of vigour is said to have been maintained for upwards of eighteen years upon no other nutriment than sixteen ounces of flour made into a pudding with water, no other liquid of any kind being taken. In nutritive value, sixteen ounces of flour will represent 1.72 ounces of albuminates, 0.32 ounces of fat, and 11.28 ounces of carbo-hydrates. "A more striking instance still is that afforded by the case of Cornaro, a Venetian of noble descent, who lived in the fifteenth and sixteenth centuries, and attained an age of upwards of 100. Impressed with the conviction that the older a man gets, and the less amount of power he possesses, the less should be the amount of food consumed, in opposition to the common notion that more should be taken to compensate for his failing power, he, at about forty years of age, resolved to enter upon a new course, and betake himself to a spare diet and a scrupulously regular mode of life, after having, as he said, previously lived a life of indulgence in eating and drinking, and having been endowed with a feeble constitution and fallen into different kinds of disorders, 'such as pains in my stomach, and often stitches and spices of the gout, attended by what was almost still worse, a continual low fever, a stomach generally out of order, and a perpetual thirst.' He also did all that lay in his power 'to avoid those evils which we do not find it so easy to remove. These are melancholy, hatred, and other violent passions, which appear to have the greater influence over our bodies. The consequence was, that in a few days, I began,' he adds, 'to perceive that such a course agreed with me very well, and by pursuing it, in less than a year, I found myself—some persons perhaps will not believe it—entirely freed from all my complaints. I chose wine suited to my stomach, drinking of it but the quantity I knew I could digest. I did the same by my meat, as well in regard to quantity as to quality, accustoming myself with nutritive matters so as never to cloy my stomach with eating or drinking, but constantly rise from the table with a disposition to eat or drink still more. In this I conformed to the proverb which says, that a man to consult his health must check his appetite. What with bread, meat, the yolk of an egg, and soup, I ate as much as weighed in all twelve ounces, neither more nor less. I drank but fourteen ounces of wine.' Upon this scanty allowance Cornaro tells us he perseveringly subsisted, living in possession of all his faculties to write a series of discourses, at the respective ages of 83, 86, 91, and 95, urging upon others to follow his example.

These discourses, which are imbued with vigour and vivacity, and contain many shrewd remarks on the subject of living, seem to have excited considerable attention at the time they appeared, and many years afterwards."

Dr. Parkes, in his interesting little work on "The Personal Care of Health," has some very valuable remarks on the proper diet for old people. "I would not advise," he says, "that the dictates of appetite should be neglected. If an old man has a good appetite, and can digest well, and is in good health, he should continue to eat as his appetite counsels; but as a rule the healthiest old people are the rather spare eaters. Some writers have indeed advised that all old people should place themselves on an extremely rigid diet, so that there can never be introduced into the body any superfluity which the organs of the body are not able to deal with. It is, in fact, certain that some of the evils of old age are owing to more food and liquid passing in than the emunctory organs can get rid of. Hence arise indigestions, bowel troubles, gouty affections, some skin diseases, and general discomfort of feeling, all of which can be removed at once by lessening the diet." I would never recommend any old man of seventy to copy Cornaro's diet, and to weigh out twelve ounces of solid food every day, but on the contrary, I advise him to consult his appetite and his digestive power. He should, however, watch the effect on his feelings, digestion, and weight, and should limit himself to that amount of food which seems to secure him perfect health.

We now pass on to consider another matter in relation to food, namely, its digestibility. Some foods are digested in one part of the intestinal canal and some in another. Thus all starchy matters are prepared for digestion while they are still in the mouth, and it should always be borne in mind that no starchy matter can possibly be digested unless it be thoroughly masticated and mixed with saliva. The digestion of starch, however, is not completed in the mouth, but it is supposed that other secretions which it encounters lower down serve to finish what has been begun by the admixture with saliva. All the albuminates are mainly digested in the stomach proper, and having passed through this organ they should be almost in a state to be absorbed into the blood. The liquid food after it has been acted upon by the digestive fluid of the stomach is called chyme. For the proper digestion of the fats, the fluid which is formed by the liver, and which is called gall or bile, is necessary. The time which food takes to digest depends upon a great many conditions. In the first place the food must be properly cooked, and to this we shall again refer when we come to speak of the cooking of food. Again, food must be properly prepared by the recipient; it must be torn asunder by the teeth and thoroughly mixed with saliva, and if this be not done, proper digestion in the stomach and intestines is impossible. Hence we see how important it is to attend most carefully to the teeth, for if they fail us, our power of digestion, and consequently of healthy existence, is very much impaired, for although the march of the art of dentistry has provided us with a most capital substitute, still, false teeth, however good, fall short of their prototypes, and it will not be forgotten also that they cost a considerable amount of money, so that for many of us the loss of teeth can never be made up.

Most of our knowledge of digestion is derived from the observations made on a



young Canadian who, unfortunately for himself but fortunately for us, had a hole in the wall of his abdomen communicating with his stomach, so that the whole process of digestion could be accurately observed. This interesting invalid was under the care of a man of great intelligence, Dr. Beaumont, and it is hardly too much to say that Beaumont by his observation on Alexis St. Martin, for that was the Canadian's name, has taught us nearly all we know about the process of digestion. The following is an account of one of Beaumont's experiments. "At half-past eleven o'clock A.M., after having kept the lad fasting for seventeen hours, I introduced a gum-elastic tube and drew off an ounce of pure gastric liquor, unmixed with any other matter except a small proportion of mucus, into a three-ounce phial. I then took a solid piece of boiled, recently salted beef, weighing three drachms, and put it into the liquor in the phial; corked the phial tight and placed it in a saucepan filled with water, raised to the temperature of 100 degrees, and kept to that point on a nicely regulated sand bath. In forty minutes digestion had distinctly commenced over the surface of the meat. In fifty minutes, the fluid had become quite opaque and cloudy; the external texture began to separate and become loose. In sixty minutes, chyme began to form. At one o'clock p.m.—digestion having progressed with the same regularity as in the last half hour—the cellular texture seemed to be entirely destroyed, leaving the muscular fibres loose and unconnected, floating about in fine small shreds, very tender and soft. At three o'clock, the muscular fibres had diminished one-half since the last examination. At five o'clock they were nearly all digested, a few fibres only remaining. At seven o'clock the muscular texture was completely broken down, and only a few of the small fibres could be seen floating in the fluid. At nine o'clock every part of the meat was completely digested. The gastric juice when taken from the stomach was as clear and transparent as water. The mixture in the phial was now about the colour of whey. After standing at rest a few minutes, a fine sediment of the colour of the meat subsided to the bottom of the phial. A piece of beef, exactly similar to that placed in the phial, was introduced into the stomach, through the aperture, at the same time. At twelve o'clock it was withdrawn, and found to be as little affected by digestion as that in the phial; there was little or no difference in their appearance. It was returned to the stomach, and on the string being drawn out at one o'clock p.m. the meat was found to be all completely digested and gone. The effect of the gastric juice on the piece of meat suspended in the stomach was exactly similar to that in the phial, only more rapid after the first half hour, and sooner completed."

Dr. Carpenter gives the following summary of what is known as to the time required for digestion:—"The attempt was made by Dr. Beaumont to determine the relative digestibility of different articles of diet, by observing the length of time requisite for their solution. But, as he himself points out, the rapidity of digestion varies so greatly, according to the quantity eaten, the nature and amount of the previous exercise, the interval since the preceding meal, the state of health, the condition and the nature of the weather, that a much more extended inquiry would be necessary to arrive at results to be depended on. Some important inferences of a general character, however, may be drawn from his researches. It seems to be a general rule that the flesh of wild animals is more easy of digestion than that of



the domesticated races which approach them more nearly. This may, perhaps, be partly attributed to the small quantity of fatty matter that is mixed up with the flesh of the former, whilst that of the latter is largely pervaded by it; for it appears from Dr. Beaumont's experiments, that the presence in the stomach of any substance which is difficult of digestion interferes with the solution of food that would otherwise soon be reduced. It seems that, on the whole, beef is more speedily reduced than mutton, and mutton sooner than either veal or pork; fowls are far from possessing the digestibility that is ordinarily imputed to them; but turkey is, of all kinds of flesh except venison, the most soluble. Perhaps the average period required for the digestion of an ordinary meal, and the complete emptying of the stomach, may be roughly estimated at from three to four and a half hours. Dr. Beaumont's experiments further show that bulk is as necessary for healthy digestion as the presence of the nutrient principle itself. This fact has been long known by experience to uncivilised nations; the Kamschatdales, for example, are in the habit of mixing earth or sawdust with the train-oil on which they are frequently reduced to live. The Vaddahs, or wild hunters of Ceylon, on the same principle, mingle the pounded fibres of soft and decayed wood with the honey on which they feed when meat is not to be had; and on one of them being asked the reason of the practice, he replied, 'I cannot tell you, but I know the belly must be filled.' It is further shown by Dr. Beaumont that soups and fluid diet are not more readily chymified than solid aliment, and are not alone fit for the support of the system; and this also is conformable to the well-known results of experience, for a dyspeptic patient will frequently reject chicken broth when he can retain solid food or a richer soup. Dr. Beaumont also ascertained that moderate exercise facilitates digestion, though severe and fatiguing exercise retards it. If even moderate exercise be taken immediately after a full meal, however, it is probably rather injurious than beneficial; but if an hour be permitted to elapse, or if the quantity of food taken have been small, it is of decided benefit; the influence of temperature on the process of digestion is remarkably shown in some of Dr. Beaumont's experiments; he found that the gastric juice had scarcely any influence on the food submitted to it when the bottle was exposed to the cold air, instead of being kept at a temperature of  $100^{\circ}$ . He observed on one occasion, that the injection of a single gill of water at  $50^{\circ}$  sufficed to lower its temperature upwards of  $30^{\circ}$ ; and that its natural heat was not restored for more than half an hour. Hence the practice of eating ice after dinner, or even of drinking largely of cold fluids, is very prejudicial to digestion."

With regard to the caution about ice, we must say that in our experience practice does not, in this matter, agree with theory. Ice after dinner is always agreeable, and the evidence that it retards digestion is very small indeed. The mistake is often made of giving too much ice, and we have been at dinner-tables where iced punch *à la Romaine* has been served in the middle of dinner, between the first and second courses; ice pudding as the *pièce de resistance* of the sweet course, and two kinds of ice, cream and water, as the first dish of dessert; this, in addition to ice in the wine, is excessive, and is, we opine, as vulgar as it is harmful.

In our chapter on the diseases of children, as well as in that on the nursing of

children, will be found many remarks on the feeding of children, and we have incidentally dwelt on the diet for old age.

It remains for us to say something on the diet which is most suited for robust manhood, and for training. The diet for a man in training should be modelled on the diet which we have given as the hard-labour diet of our prisons, and which is found by experience to allow of a man's performing a maximum amount of work without deteriorating in health. It consists of about twenty-six ounces of dry food, or twice that amount of food in an ordinary moist condition. The diet must include from four to five ounces of albuminates, and if the athlete be still growing this amount may even be increased, the best criterion being the man's own appetite. It is a great mistake—a mistake which is now very generally recognised by trainers—to give the man in training a diet which is too exclusively albuminate. His need is mainly for readily combustible fuel, to produce the large quantities of force which he is obliged to put forth, and if these be not given to him he will consume his muscular tissue, and become “stale.” A training diet should be very plain, should contain a proper admixture of the four dietetic principles, should be very varied, should be as digestible as possible, and should be free from all spices, condiments, and other articles which are likely to tempt the appetite beyond the requirements of the system. Rice puddings, potatoes, butter, bacon, eggs, and fat meat should all be given, together with a fair amount of green vegetables. The old plan of raw beef-steaks and mutton chops, with a thin slice of stale bread for breakfast, luncheon, and dinner, day after day, is happily come to an end.

We may now say a few words on the all-important subject of cooking food, although we have no intention of trenching on the ground which belongs to a work on cookery. Man is distinguished as a “cooking animal,” and indeed he is the only animal that does not consume his food raw. It is needless to say that it is a *sine qua non* of health and proper nourishment, that the food should be properly cooked. Cooking is a delicate chemical operation, and although it is too much the custom to relegate the duties of the kitchen to those who have received hardly any education, it is, nevertheless, true that those duties demand of those who *rightly* perform them patience, education, and very great intelligence. Dr. Parkes in his latest work published by the Society for the Propagation of Christian Knowledge, “On the Personal Care of Health,” makes the following remarks on the importance of a right understanding of the subject of food, and the method of cooking it :—

“I question whether an artisan or labourer in receipt of pretty good wages, which he does not spend in drink, is not the best-fed man in the community, if he has an industrious wife who knows how to cook. If she is an understanding woman she will give him enough variety, and he receives every day, at the same hours, well distributed over the day, about an equal quantity of well-cooked food, over the eating of which he does not hurry. If such a man is a teetotaller, or does not take more than two pints of beer daily, it will be seen that he changes little in weight during the whole period of maturity, and that years tell little on his appearance. If he takes too much beer and spirits, as so many do, he begins to get fat about forty, and then ages.



“Compared with such a temperate working man the wealthy classes as a rule are, I think, clearly less well off. They have the best description of food and the best possible cookery, but they have neither the regularity of time nor quantity that the sober working man has. The perfectly cooked made dishes of our day are, no doubt, extremely digestible, but that advantage and their variety leads to a large consumption. As a rule the wealthy classes eat too much—with, of course, exceptions—and it eventually tells upon them. Both men and women get stont, and between forty and fifty years many begin to suffer from affections which are called by diverse names and affect diverse organs—lungs, liver, or other parts, but which are more or less allied to dyspepsia or gout. It is, of course, always hazardous to extend to a class the conclusion drawn from a few instances, but, in spite of the excellent health-conditions in which most of our rich people are placed, we do not see so great a superiority in health in the latter years of manhood as should be the case.

“Although, also, there is very little intemperance among them, in the usual sense of that word, they take a good deal of alcohol in one way and another, and I think most medical men will agree that Abernethy’s advice is the only cure for the manifold ailments of many rich patients, viz., ‘to live on sixpence a-day, and earn it.’ There are, however, unhappily, people among us who have neither the simplicity of the poor nor the gratification of the rich man’s diet, but who suffer in another way—I allude to the numerous class who are dependent upon ill-trained servants for their cooking. A married clerk receiving some £200 or £300 a year is really very badly off in this way. His wife, having received the usual ornamental education of our time, knows nothing useful, and would think it a degradation to descend to the kitchen and to busy herself in providing for her household.”

Yet what increased health and happiness would arise to her husband and children; what pleasure would come to herself—for labour is pleasure—if she were a good cook, and would give three or four hours’ work in preparing what is so essential for health and energy. If young ladies would only see that cooking is really a branch of chemistry, and that it is, therefore, a scientific as well as a most useful art, and if they would get over the ridiculous pride of thinking honest labour a degradation instead of what it really is—a blessing, how many of our countrymen would dine well instead of badly, and be robust instead of weakly. The social effects of such a change in sentiment and in action would be surprising; it would solve many difficulties of servants, which are felt more and more every year, and it might even give a reply to the important question which is always arising and never answered, viz., “whether it is right to marry on £300 a year.”

Meat may be cooked in a variety of ways, but the chief of these are boiling and roasting. Now meat is composed of albuminous matter and fat, the fat melts when heated, and the albuminous matter coagulates and gets hard and impervious to water when its temperature is raised above 180° of Fahr., which is 32° below the boiling point of water.

Now, first of all, as to boiling. In boiling we want to fulfil one of two objects: either to impart all the goodness of the meat to the water, or else to leave all



goodness in the meat without benefiting the water. If the former object is desired, as in making a strong broth, the meat should be cut up in small pieces and the water should be poured upon it cold. The vessel should then be placed at the side of the fire, where it should be allowed to remain for some hours, care being taken that the temperature does not rise above  $180^{\circ}$ , unless it be just at last, in order to extract those few ingredients of the meat which are soluble in boiling water. If these rules be adhered to, and if the thermometer be employed, as it always should be, the broth must be the strongest possible.

If it be desired to fulfil the second object of boiling, as is the case when a joint is boiled to be served whole at the table, we proceed differently, in order to preserve as much of the goodness as possible. To effect this we plunge the joint at once into *boiling* water, and allow it to remain for a few minutes. By this manœuvre all the albumen on the outside of the joint is coagulated, and the joint is encased, as it were, in a solid coat of armour. This being done, the joint must be left in the water, and not allowed to get to a temperature greater than  $170^{\circ}$  or  $175^{\circ}$  during the remainder of the operation of cooking. If these very simple rules were attended to we should not hear so often of a joint being "boiled to rags."

However carefully the operation of boiling be conducted there is always some loss of weight, owing to the solution of the mineral salts and other soluble constituents of the meat. The loss of weight in boiling is reckoned at from 20 to 30 per cent. of the meat.

Stewing is a mixture of the two kinds of boiling. We manufacture a strong broth and with it we eat the exhausted fibres of the meat, which are very tender from the excessive amount of boiling to which they have been subjected.

Roasting is a very favourite way of cooking, on account of the very pleasant flavour which it imparts to the meat. Buckmaster, who may be taken as an authority on the practical matters connected with cooking, says, experiments which have been carefully made show that a sirloin of beef, weighing twelve pounds, lost in roasting forty-four ounces, of which twenty-seven were water and seventeen fat, or dripping. A flank of beef made into pot-au-feu or bouilli, and weighing twelve pounds, lost twenty-five ounces. It is therefore quite clear that boiling, especially when the liquor is turned to account, as it should be, is the most economic kind of cooking. Notwithstanding this truth, however, roasting before the fire remains the favourite method of cooking in this country. The principles involved in roasting are the same as in boiling, and our efforts must be directed to imprisoning the juices of the meat. To effect this a good clear fire must be made, and for the first fifteen or twenty minutes the joint must be placed as close as possible to it without burning. It must then be removed to some distance and the process continued as slowly as possible, in order to retain the juices as much as possible. It is a common custom to paint a joint with white of egg before roasting, or to encase it in a layer of paste, or to wrap it in a piece of oiled paper.

Broiling is a modified form of roasting, and is done over the fire instead of before it. The meat must be put at first quite close to the coals and then be removed from them.

We next turn to consider some of the chief diseases which are caused by food,

either from its excess or deficiency, or from some deleterious character in the food itself.

Too much food causes plethora, and leads to obesity, to a lethargic habit of body, and to a great liability to congestive diseases and gout. If the food is not digested it either irritates the bowels, and is passed quickly away, causing diarrhoea, and sweeping with it the necessary as well as the unnecessary food. If it do not cause diarrhoea, it remains in the intestines, causing pain, and decomposes, giving rise to the generation of offensive gas, or to worse troubles.

If an excess of albuminates be given, the tendency is towards gout; and it is to be remembered that, when a strong meat diet is being consumed, it is of the greatest importance that the consumer should take quantities of exercise. Gout is most common, perhaps, among those robust gentlemen who have passed their middle age, and having been accustomed all their lives to a generous diet, and the strong exercise of hunting, forget when they are compelled to forego the pleasures of the chase to be sufficiently self-denying at the table. The constant habit of great muscular exertion has begot another habit of generous feeding, and the strong digestion which has been trained through the whole of a healthy life is often at last far from a blessing to its owner. We not long ago encountered a spare, very healthy-looking, elderly gentleman, who, at the age of sixty years and more, had that day been enjoying, as usual, the joys of fox-hunting. On congratulating him on his un failing powers and his healthy appearance, he accounted for the fact by saying that "he was one of those who had been blessed with a weak digestion, that while the friends of his youth were dying one by one, carried off by plethora in its various forms, he, compelled by his frailty to live carefully, pursued that even tenor of his ways without, as yet, being aware of any of the onslaughts of time."

An excess of starchy food, or of sugars or fats, is very apt to cause obesity, and it is well known that the surest way of arresting a tendency to corpulence is to cut off carbo-hydrates from the diet. Corpulency is to be avoided, not only on account of the disfigurement and inconvenience which it causes to its victim, but rather because when there is fat on the surface there is commonly fat beneath also, and an accumulation of fat around internal organs interferes often very seriously with their efficient action. The diseases which arise from a superfluity of food are confined generally to the wealthy classes, and especially to the bourgeois class—successful tradesmen, aldermen, and "self-made" men generally, who have never been trained to any of the pursuits of fashionable idleness in their youth, and find themselves obliged, when fortune gives them an abundance of money, to fall back for their amusement to the delusive joys of eating and drinking.

A deficiency of food is a very serious matter to a nation, as those who remember the Irish famine and the disasters which followed it can testify. A deficiency of food, and especially of fresh meat and vegetables, engenders a habit of body which is called scorbutic, and which reaches its most aggravated form in the disease called scurvy. Scurvy is happily very rare in the present day, and there are many medical men of large experience who have never seen a case. Even among sailors, who formerly were the greatest sufferers from scurvy, the disease is seldom seen, because the proper methods of providing against it are thoroughly understood. Scurvy is a very terrible disease.



and it is characterised by bleedings, purple patches, and terrible ulcerations of the skin. A man with the scurvy is fit for nothing, and the slightest injury may cause serious troubles and death. When numbers of scorbutic persons are herded together, diseases of a low type are very liable to break out among them. Before the introduction of the potato into Europe, and before the art of horticulture had placed at our disposal such a variety of vegetables, the majority of the lower orders were of a scorbutic habit, and this it was which gave such a fearful virulence to the epidemics of the middle ages, for it must not be supposed that scurvy merely shows itself as such. The diseases known as typhus fever, jail typhus, the purples, spotted fever, and even, there is good reason for believing, some forms of dysentery, the black death, plague, and sweating sickness, owed their peculiar energy to the scorbutic condition of the populations which they attacked.

Dr. Guy, in his most interesting lectures on "Public Health," says:—"About a century ago a vessel of war might seem to have been equipped and provisioned with a view to the production of the greatest possible amount of disease in the shortest possible space of time. Beef badly salted, and often so rotten that, before boiling it, it was necessary 'to tie it round with cords;' biscuits mouldy and full of 'weevils or maggots;' and puddings of salt suet and flour made up the dietary.

"The water was often so thick and green from decomposition and vegetable growth, and so offensive withal as to disgust sight, smell, and taste. The ship was damp, filthy, and ill-ventilated, and the air of the wells so foul as often to produce fatal asphyxia. Personal cleanliness was neglected, the clothing was insufficient, and the bedding too, the men having to turn in between blankets unwashed perhaps for a year; little effort was made to amuse the mind and to instruct it; the sailors' only luxury was an exorbitant allowance of spirituous liquors on sea as on land, the fruitful source of disease, misery, insubordination, and crime." The account which Dr. Guy gives of the famous voyage of Commodore Anson will show under what frightful difficulties some of England's greatest navigators have worked.

"On the 18th of September, 1740, Anson set sail from St. Helen's, and on the 15th of June anchored at Spithead, having been absent from England three years and nine months. He left with six vessels of war, and two victuallers, and came back with his spoils and a reputation richly earned, but with a single ship, his own *Centurion*. Our interest centres in three of these ships, the *Centurion*, the *Gloucester*, and the *Tryal*, and the 961 men who formed their united crews. Such crews, we may hope, were never before or since brought together to tempt Providence, and to try the mettle of a gallant commander. Of the seamen some were drafted direct from hospital and sick quarters. The land forces were men mostly sixty years old, some upwards of seventy, the worst half of a batch of invalids of whom the younger and more active had deserted. In lieu of the deserters Anson was furnished with 210 raw and undisciplined marines, with scarcely more of the soldier than the regimentals, some of these too had been lately discharged from hospital. . . .

"The run to Madeira occupied thirty-seven days instead of the usual ten or twelve, and the crews suffered from the fevers then known as the calentures. The *Centurion* lost two men. The ventilation being recognised as inadequate, six air scuttles were ordered to be made in each ship, and a supply of water, wine, and other



refreshments, was laid in. The forty-seven days' run to St. Catherine's produced a serious sick list; eighty men were landed sick from the *Centurion*, of whom twenty-eight died; and yet by the time they left the island the eighty had become ninety-six. These were embarked, and in thirty days they reached Port St. Julian, which place, after a stay of ten days, they left in good spirits, and, as I gather, in good health. It was the 105 days spent between St. Julian and Juan Fernandez, amid storms, cold, frosts, and deluges of water, under unparalleled exposure, fatigue, and privation, that occasioned the greater part of the sickness and mortality of which I am presently to give a summary. In about ten days after leaving St. Julian the scurvy began to show itself, and in less than two months it had spread to such a degree that there were few on board free from it. Soon after we read of forty-two dying on board the *Centurion*, then in the month following, double the number, and by the time the ship arrived at Juan Fernandez there had been a loss of upwards of 100 men, and they could not 'muster more than six foremast men in a watch capable of duty,' and even some of these were lame, and unable to go aloft. I must not detain you with further details of the sickness and death on board the *Centurion*, or with the adventures of the *Gloucester* and *Tryal*. Suffice it to say, that in the short space of less than nine months, the time spent between England and Juan Fernandez, the crews of the three ships had lost 626 out of 961, or, if we limit ourselves to the *Centurion* and its crew, concerning which we have the most exact information, it appears that in less than nine months, her 506 men were reduced to 214, her fifty invalids to four, and her seventy-nine marines to eleven. Of this frightful mortality, by far the greater part occurred in the stormy and every way inclement weather encountered in rounding Cape Horn, in the two months and a half that elapsed between leaving Port St. Julian and arriving at Juan Fernandez.

"It belongs to this sanitary history to state that at Madeira, St. Catherine's, St. Julian, and Juan Fernandez, the foul ships were refitted, cleansed, and purified, and that no sanitary precaution seems to have been neglected. Nor were these measures ineffectual, for we are told that for some time after leaving Juan Fernandez the crews had enjoyed 'a most uninterrupted state of health.' But on leaving the coast of Mexico the scurvy again began to show itself, and this time it was not possible to attribute it to the stormy and inclement weather, though that which they soon had to encounter doubtless added much to their sickness and mortality. At this time the crew of the *Gloucester* was reduced to seventy-seven men and eighteen boys, of which number only sixteen men and eleven boys were able to keep the deck, and of these several were infirm. The ship had to be burnt, and her crew transferred to the *Centurion*. There were seventy sick among them, of whom 'three to four' died as they were being hoisted on board. And soon we find that the deaths of the consolidated crews were 'extremely alarming;' that no day passed that they did not bury eight, ten, or twelve; and that 'those who had hitherto continued healthy began to fall down again.'" When they were able to land on the island of Tinian they put on shore 128 sick, many of whom were carried on the backs of the commodore and his officers. On that and the previous day they buried twenty-one men, and ten more soon after. Anson himself, as we learn, did not escape the scurvy.

“This new attack of scurvy occurred under circumstances so different to the first as to puzzle the surgeon and the chaplain. They had fresh provisions in the shape of hogs and fowls, they caught fish in abundance, and had an ample supply of fresh water; they kept all their ports open, ‘and took uncommon pains in cleansing and sweetening the ship.’ But no mention is made of vegetables or fruits, and they owed their supply of water to rains which must have kept the atmosphere moist, and so far unfavourable to them. The crews recovered their health at Tinian, and all that now remains of the sanitary history is the simple statement that when Anson came to muster the remains of the united crews of the *Centurion*, the *Gloucester*, and the *Tryal*, on board his own ship, prior to his attack on the Manilla galleon, he had in all only 227 hands, of whom nearly thirty were boys, and twenty-three Lascars and Dutchmen, besides other recruits picked up here and there. So that out of the original 961 with which Anson left England, the survivors probably fell very far short of 200.”

Shortly after this disastrous voyage of Anson's the important discovery was made that the occurrence of scurvy depended upon the want of fresh meat and fresh vegetables; and the still more important discovery that these could be substituted by so portable and easily procurable a substance as lemon-juice. Lemon-juice has now become a necessary part of the commissariat of every ship, and a real bad case of scurvy has happily in these latter days come to be regarded as a curiosity.

The disease *par excellence* which is liable to break out in times of famine is *typhus fever*, which has also been occasionally spoken of as *famine fever*. Typhus killed its thousands at the time of the Irish famine. It is a noteworthy fact with regard to typhus (a disease having nothing in common with typhoid), that it never appears except under the circumstances of famine and overcrowding, but when once the poison has been engendered in this way it is communicable to all classes, and the well-fed and well-to-do fall victims to the disease as readily as others. In epidemics of typhus, it has always been observed that doctors, ministers of religion, and nurses, succumb very readily. There can be no doubt that the disease which ravaged our prisons in the days of John Howard, and which, under the name of “gaol fever,” struck terror into all those whose duties brought them in contact with the criminal classes, was a form of typhus fever which was engendered in our prisons by overcrowding, improper dietaries, and general neglect of the laws of health.

Dr. Guy, whose work on “Public Health” is one of the most interesting and valuable contributions to popular scientific literature which has been made of late years, gives an admirable account of the gaol fever, and the labours of one of England's greatest heroes—John Howard.

Quoting from Sir John Pringle, he gives the following account, which will serve as an admirable illustration of what this gaol fever could, at times, effect. “In the year 1750, on the 11th of May, the sessions began at the Old Bailey, and continued for some days, in which time there were more criminals tried, and a greater multitude was present in the court than usual. The prisoners, about 100 in number, were crowded into two rooms, measuring fourteen feet by eleven, and seven feet high, and in the bail-dock (a small corner enclosure open at the top), into which



were put some who had been under the closest confinement. The court itself was about thirty feet square, and into this narrow crowded space the air from the bail-dock and the two small rooms found easy access. An open window at the farthest end of the room from the bench occasioned a draught in the direction of those who were found to have suffered most. These were the persons on the bench, of whom four were attacked and died—namely, Sir Samuel Pennant, the Lord Mayor; Sir Thomas Abney, and Baron Clarke, judges; and Sir Daniel Lambert, alderman. The other victims were two or three counsels, an under-sheriff, several of the Middlesex jury, and others, to the amount of above forty. This list is exclusive of persons of a lower rank and of those who did not sicken within a fortnight.”

With these examples of the dangerous state of mal-nutrition into which populations may fall if improperly nourished, we now turn to consider some smaller points, but of scarcely less importance in domestic circles. To what extent is bad food—food, that is, which from some cause or another has deteriorated in quality—capable of causing disease? It is more difficult than might have been expected to give an accurate answer to this question, since evidence on the point is very contradictory.

Is it safe to eat food in a state of decomposition? The lover of game and venison would reply to this, that no amount of rottenness interferes either with its agreeable qualities or its wholesomeness. Rotten fish is used in some parts of the world as a condiment without any evil resulting. It would seem, however, as if occasionally, flesh in the early stage of decomposition, before it becomes tainted either to nose or taste, is apt to act as a violent irritant upon the stomach. This has happened occasionally with pork, and whole families have suffered severely after eating pork, against which nothing could be proved, except that it had been kept rather longer than usually is the case. Fish sometimes acts as an irritant poison in the same way, and so do mussels. This poisoning by mussels has been supposed to be due to the fact that the molluscs were taken from the copper bottom of a ship, and that really the poisoning element was the copper, and not the flesh of the mussel. Perhaps copper-poisoning has occurred in this way, but there can be no doubt that the mussels themselves are occasionally very unwholesome. Other varieties of shell-fish are not free from similar imputations of proving dangerous to the consumer.

To what extent do the diseases of animals affect the health of men who may consume them? This is a question of great importance, but exact information on the point is very hard to obtain. There can be no doubt that much diseased meat is from time to time smuggled into the market, and that much is eaten without any very obvious effects resulting is also a matter of fair inference. At the same time we should be inclined to give a general caution that it is never safe to eat meat which is known to have come from a diseased animal.

The flesh of cattle and of the pig is apt to be infested with parasites, and if some of the parasites find their way into the stomach of man *in a living state* they are apt to produce serious discomfort, if not death.

Both pork and beef is apt to be “measly,” and in these cases the flesh is studded with small round bladder-like bodies which vary in size from points scarcely visible



to the naked eye to masses nearly a quarter of an inch in diameter. These bodies are called *Cysticerci*, and if taken alive into the human stomach, grow into tape-worms. The tape-worm which is got from mealy pork is called the *Tenia solium*. That which comes from beef is called the *Tenia mediocanellata*. Tape-worms are not dangerous to life, but are very difficult to dislodge, and cause great discomfort and prolonged ill-health.

Another animal which infests the pig is called the *Trichina spiralis*, and so much has been written in popular literature of late years on the subject of trichines, that few of our readers will be ignorant of the prominent facts concerning them.

The trichinæ are small worms which are usually found coiled up in a calcareous cyst, in the substance of the muscles of animals. The largest of these cysts are about one-twenty-fifth of an inch in length, and many of them are much smaller. When once the worm becomes encysted its life is very likely to be prolonged, and although in this state they remain quiescent, and give perhaps but little trouble to the animal which they inhabit, yet if they be taken into the stomach of another animal the cyst may be dissolved, and the animal may become again active, and increase and multiply to an alarming extent.

The flesh of an infected animal may be so crowded that many thousands of trichinæ may exist in a cubic inch.

One of the first noteworthy epidemics of trichinous disease occurred at Heldstadt, in Prussia, in 1863. Of 103 persons who partook of a dinner at an hotel, nearly all were attacked with trichinosis (as the disease is called), and very many died. The source of the disease in this case proved to be a peculiar kind of sausage, of which nearly all had partaken. The trichina is not found only in the pig, but affects other animals as well, and the pig in many cases is supposed to have contracted the disease by foul feeding on the flesh of smaller animals. The trichina is killed by a boiling temperature, and it is only those who eat raw or under-done pig's flesh who are liable to become infested. The custom of eating raw ham and raw sausages, which have only been partially smoked, is very common in Germany, and hence it is that this disease has been better known in Germany than in this country. "It is of interest to know," says Professor Austin Flint, "somewhat of the chances that the pork used for food may be trichinous. A committee of the Chicago Academy of Science, appointed to make examinations with reference to this point, reports that of 1,394 hogs examined in different packing houses and butchers' shops in Chicago trichinæ were found in twenty-eight. It was therefore estimated that of the hogs brought to the Chicago market one in fifty is affected by trichiniasis in a greater or less degree. In this report it is stated that in the city of Brunswick, Germany, of 19,747 hogs examined, only two were found to contain trichinæ." The trichinous meat being swallowed by the victim, the capsules of the worms are destroyed, and the liberated animals increase and multiply in the intestines at an alarming rate, so that it has been estimated that the trichinæ contained in half a pound of meat may be sufficient to give rise to 30,000,000 trichinæ in a few days. This enormous litter of new-born trichinæ at once begins to bore through the wall of the intestine, to take up their abode in the muscles. During this period the symptoms are those of gastric and intestinal irritation, accompanied by stomach

pains and diarrhœa. As soon as the muscles are reached, the symptoms change to those of muscular rheumatism, accompanied by a good deal of constitutional disturbance. The best treatment of the disease is probably active purgation in the early stage, but when once the muscles are reached no remedy is known which possesses any power to dislodge them.

The statement has several times been rather loosely made that animals fed on sewage farms are unwholesome for food. We wish very distinctly to state that there is no foundation whatever for such an assertion, and that if sewage farms be properly managed, with due regard to scientific and cleanly considerations, the meat grown upon them is not only of remarkably fine quality, but perfectly wholesome.

*Milk* has, unhappily, been the means of spreading disease upon several occasions of late years. It must be remembered, however, that pure milk, if fresh, is very rarely unwholesome, and that the instances of typhoid fever and scarlet fever being disseminated by milk have been in every instance directly traced to the adulteration of the milk with water. The water was the poisonous element in all these cases, and not the milk. The celebrated "milk epidemic," which occurred in the parish of St. Marylebone in the year 1874 may be taken as a sample of all "milk epidemics," of which several have now been recorded. Several persons, numbering upwards of 100, were seized at or about the same time, within a few weeks, with typhoid fever. It was highly probable that there was some common cause, and the health officers and others set themselves to work to discover what that cause was. The cases were scattered through the parishes of St. Marylebone and St. George; and it was a noteworthy fact that people suffered who were supplied with water from different sources. The drainage was above suspicion, and the houses attacked were chiefly the houses of the wealthy or the well-to-do persons. The only thing in common between the houses was the sources of their milk supply, and it was found that these scattered families all obtained their supply of milk from the same dairy. It was noted also that the denizens of the nurseries and those who were most dependent on milk as an article of diet suffered most in this epidemic. There were some cases which apparently at first did not admit of any explanation on the milk theory, but most of these, on careful inquiry, were found to yield confirmatory evidence of an extraordinary kind. Thus, in one household which was not supplied by the dairy implicated two servant-maids were attacked, and the fact was elicited that they had, on one afternoon, actually stopped at the shop of the dairy and purchased a glass of milk, which they drank. Now, this dairy obtained its supply of milk from several farms, and these farms were subjected to minute inspection. All save one were beyond suspicion as to their sanitary arrangements, but at this one there had been cases of typhoid fever, and on careful investigation it was found that the well from which the water was taken to cleanse the milk-pails, if not to adulterate the milk, had, by the leakage of a drain, become actually impregnated with the excreta of the person who had suffered from typhoid fever. This farm was situated at a distance of fifty miles from London, and thus we are confronted with the fact of an epidemic of an alarming nature, affecting an urban population, being caused by faulty arrangements on a farm in a comparatively remote district of the country.

The vegetable foods do not seem so liable to cause widespread attacks of disease as



do the animal foods. Vegetables, of course, may be unwholesome from decomposition, and various vegetable articles of diet may be unwholesome from adulteration, but it does not behove us in this place to enter into details on such questions. It is true that epidemics of cerebro-spinal fever have been attributed to the "mouldiness" of the corn upon which the stricken populations have been nourished, but such assertions are very devoid of anything like foundation.

Rye seems, at present, to be the only grain which is liable to recognised disease which is likely to prove, and indeed has proved, disastrous to those who have consumed it in its diseased state. Rye is liable to be attacked by a fungus, which, commencing in the pistil of the grass, grows gradually, and ultimately by its size overshadows the normal grass. This fungus growth is called *ergot*, and at times the growth of ergot in the rye has become excessive. Dr. Wood of Philadelphia says:—"Since the days of Galen, there have swept over larger or smaller districts of Europe epidemics of diseases which have been attributed to ergot. When the summer is wet and cold, the rye becomes very extensively ergotised, so that the fungus constitutes a large proportion of the material entering into the bread. It is under these circumstances that there occurs those epidemics of *ergotism* or chronic ergotic poisoning, which have been recorded from time to time since the days of Galen and of Cæsar. It is not always the rye which causes these frightful losses of life, as Hensinger has traced one epidemic to diseased oats."

The usual effect of consuming ergotised rye is the occurrence of mortification or gangrene of the extremities of the body, and this *gangrenous ergotism* has been especially observed in France, and is believed to be the same as the *Ignis sacer* or the *Ignis Sancti Antonii* of the Middle Ages, an affection which, in A.D. 922, killed 40,000 persons in South-western France; and in A.D. 1128-29, 14,000 in Paris alone.

There is another form of ergotism in which the symptoms consist chiefly of violent spasmodic contraction of the muscles of the body.

*Beverages.*—In our remarks on "Food" we have hitherto confined ourselves almost exclusively to solid food, and have said nothing about the no less important fluids which we find it necessary to take. To the important subject of "Water" in all its relations to health, we purpose devoting a separate chapter, and in the present section we shall deal with beverages exclusive of water, which, nevertheless, is, of course, the foundation of all beverages.

In the first place we shall be expected to give some expression of opinion on that much debated point—the value of *alcohol* as an article of diet. This is a question which requires to be considered with philosophic calmness, and no amount of assertion or counter-assertion, unbacked by solid facts, is capable of settling—as some of our temperance advocates seem, by their acts, to think—this much vexed question.

As many people are in the habit of talking of "alcohol" without really knowing what they are talking about, it will be advisable to begin with some facts with regard to the sources of origin of this body. Alcohol is obtained chiefly from sugar and bodies containing sugar (such as grapes), by the process known as fermentation. Fermentation may be looked upon as a "natural" process, since the bodies which cause it are ever present in the air, and it is supposed that these bodies, or germs,



falling into the fermentible liquid set up that action which has as its result the development of alcohol. Grape-juice, exposed to the air in a suitable vessel, speedily begins to ferment, and in process of time becomes wine. This fact must have been discovered at a very early period of the world's history, since the oldest writings make mention not only of "wine that maketh glad the heart of man," but also of its opposite effect of drunkenness.

All wines and naturally fermented liquids contain alcohol only in comparatively small quantities. If it be desired to separate the alcohol from the wine, it is necessary to resort to the *artificial* process of distillation, and in this way a stronger solution of alcohol, called "spirits of wine," is obtained. Spirits of wine, obtained by simple distillation, is a combination of alcohol and water, and the obtaining of the pure alcohol from the spirit is a difficult matter requiring very careful chemical manipulation. Pure alcohol, *absolute alcohol*, as it is called, is a rare article, but alcohol in its diluted form of *spirits of wine* is well known. Spirits of wine is a light fluid, of less specific gravity than water, on the top of which, if gently poured, it floats. If stirred about it readily mixes with water in all proportions. It has a slightly pungent odour, and if poured upon the back of the hand, it rapidly evaporates, causing a sensation of cold. In the mouth it produces a burning sensation, and brought in contact with flame it readily takes fire, as all who possess a spirit lamp, or have played at "snap-dragon," must be aware.

This is the "alcohol" then of which we hear so much, and which has proved a doubtful blessing to the human race. It is alcohol which endows all fermented and distilled liquids with their good and bad properties. Alcohol is contained in them in very different amounts, as the following table of percentages will show:—

Ginger Beer	. . . . .	A trace
Beer (average sample)	. . . . .	5 per cent.
London Porter	. . . . .	5.36 "
Edinburgh Ale (unbottled)	. . . . .	5.7 "
„ (2 years in bottle)	. . . . .	6.06 "
Port (weakest)	. . . . .	14.97 "
„ (strongest)	. . . . .	17.10 "
Sherry (weakest)	. . . . .	13.98 "
„ (mean of 13 wines not long in cask)	. . . . .	15.37 "
„ (strongest)	. . . . .	16.17 "
Madeira (long in cask in East Indies)	. . . . .	14.09 "
„ (strongest)	. . . . .	16.9 "
Dry Lisbon	. . . . .	16.14 "
Marsala (Parkes')	. . . . .	15 to 25 "
Bordeaux Wines, Red (mean of 90 determinations of different sorts - Château Lafitte, Margeaux, Larose, Barsac, St. Emilion, St. Estephe, &c., Parkes')	. . . . .	6.85 to 13 "
Bordeaux Wines, White	. . . . .	11 — 18.7 "
Rousillon	. . . . .	11 — 16 "
Rhone Wines (Hermitage, &c.)	. . . . .	8.7 — 13.7 "
Burgundy, Red (Beaune, Macon)	. . . . .	7.3 — 14.5 "
„ White (Chablis, &c.)	. . . . .	8.9 — 12 "
Champagnes	. . . . .	5.8 — 15 "
Moselles	. . . . .	8 — 13 "

Rhine Wines	.	.	.	.	.	6·7 to 16	per cent.
Italian Wines	.	.	.	.	.	14 — 19	„
Brandy	.	.	.	.	.	50 — 60	„
Gin	.	.	.	.	.	49 — 60	„
Whisky	.	.	.	.	.	50 — 60	„
Rum	.	.	.	.	.	60 — 77	„

We have been unable to ascertain the alcoholic strength of some of the more fashionable liqueurs, such as *chartreuse*, *curaçoa*, *aniset*, &c., but it is certainly very high indeed.

If we wish to ascertain the amount of absolute alcohol which we consume in a draught of any of the alcoholic drinks, we can easily do so by means of a rule of three sum.

Thus half a pint of beer contains 10 ounces, and the alcoholic strength of beer is 5 per cent.—*i.e.*, in every 100 ounces there are 5 of absolute alcohol. Thus—

$$\begin{array}{l} \text{As } 100 : 5 :: 10 \\ \qquad \qquad 5 \times 10 \\ \hline \qquad \qquad 100 \end{array} = \cdot 5, \text{ or half an ounce of alcohol.}$$

Again, a sherry glass equals about 2½ ounces, and therefore in the average “2 glasses of sherry”—

$$\begin{array}{l} \text{As } 100 : 15\cdot37 :: 5 \\ \qquad \qquad 15\cdot37 \times 5 \qquad \qquad 76\cdot85 \\ \hline \qquad \qquad 100 \qquad \qquad 100 \end{array} = \cdot 7685 \text{ ounces.}$$

Again, take a glass of strong gin (2·5 ounces)—

$$\begin{array}{l} \text{As } 100 : 60 :: 2\cdot5 \\ \qquad \qquad 60 \times 2\cdot5 \\ \hline \qquad \qquad 100 \end{array} = 1\cdot5 \text{ ounces.}$$

Thus we see that a “glass of gin” (two and a half ounces) is equal in alcoholic strength to a pint and a half of beer (thirty ounces), and four glasses of sherry (ten ounces).

Is alcohol a food, and is it in any way serviceable to the human body? Now it is only fair to assume that anything which is absorbed and disappears when introduced into the human body is in some way serviceable to it. If it is not used as a food it will certainly re-appear in the excretions in the same form in which it was introduced. Experiments have been made in this way with alcohol, and all the excretions—from bowels, kidneys, skin, and lungs (the breath)—have been carefully collected and subjected to the most careful analysis, in order to detect the presence of alcohol.

The result of these experiments tends to prove that when alcohol is given to a healthy man (many of these experiments have been conducted on soldiers), a certain amount disappears in the body. The body of a healthy man seems capable of appropriating *as a maximum* about two ounces of alcohol in the day. If more than two ounces be given, alcohol begins to appear in the excretions; it is detected by analysis in the urine and by the odour in the breath. It is certainly of great interest to find that the results of scientific investigation and practice are in such accord. Two



ounces of alcohol is the amount contained in one quart of beer of moderate strength, and this is about the amount which a man has been allowed by common consent to consume in a day without being considered to take too much. It must be borne in mind that this *two ounces* is the *maximum* allowance for a strong man, and that for most of us a much smaller allowance (one ounce or one and a half ounces) would be sufficient.

When considering the question of the dietetic value of alcohol, we must be careful to draw a distinction between *alcohol* and *alcoholic drinks*, for the latter often contain many ingredients of dietetic value in addition to the alcohol. In discussing the dietetic value of alcoholic drinks, too, it is important to distinguish between those which are the result of a *natural* process of fermentation and those which we owe to the ingenuity of man.

When administered in any form and in moderate quantities, to a slight extent, the appetite and the digestive power, and force of the action of the heart. 3. It has a slight effect to a slight extent. It certainly gives a feeling of exhilaration, it excites the imaginative, if not the other intellectual faculties. In quantities which are at all excessive, alcohol causes various symptoms due to a weakening of the muscular walls of the blood vessels. This effect is plainly detectable in the breath, and in the want of nervous power which we call "drunken-

ness." The symptoms, be it observed, are all paralytic, and are all due to a loss of voluntary control. The flushing of the face shows the vessels are dilated; soon the slipshod utterance shows the weakness of the muscles of articulation; the double vision shows the loss of power in the eyes; and the staggering gait shows the weakness extended to the larger muscles: lastly, the condition so closely resembling apoplexy that the physician can hardly rightly to distinguish the one from the other. If alcohol be persisted in, there soon results a degeneration of the nervous system. The nervous tissues are, perhaps, the first to suffer, and the tottering gait are infallibly followed by a similar tottering of the mental faculties. The stomach resents the constant introduction of spirits, and soon refuses properly to digest food. The lungs also suffer out in a similar way, and the impairment of their functions causes terrible dropsy. The heart gets fatty and weak, the lungs lose their fresh elasticity, and soon there is not a tissue in the body which has not in one way or another succumbed to the ill-treatment to which it has been subjected.

The first sign, be it observed, of having taken too much alcohol is the flushing of the face, and as soon as a man becomes "flushed with wine" he has had too much.

There are two conditions which undoubtedly aggravate the evils of intemperance. One is the taking of alcohol in too concentrated a form—in the form, that is, of "neat spirits," or even the fortified ports and sherries. We believe spirits to be an unmitigated curse to the world, and we do not believe that their administration is



ever justifiable, except in case of sickness. In disease it is sometimes necessary (but not often) to give considerable doses of alcohol in small bulk, and then spirits are of use.

The other aggravating condition is the taking of alcohol *on an empty stomach*. As a rule, no alcoholic drink should be taken except with food. We feel sure that more harm is done by "nipping," as it is called, with glasses of sherry between meals, than by any other form of intemperance. If alcohol were always taken in a diluted and natural form, and with food, comparatively little harm would result from its employment. The "nightcap" of hot spirits and water at bed-time is a common cause of morning cough, sickness, and inability to eat breakfast.

We have shown with tolerable conclusiveness that the excessive use of alcohol works unmitigated harm, and that its moderate use does not, as far as can be shown, work any harm at all. The more important question, however, is this, Is alcohol necessary, and are we the better for taking it?

There is no doubt whatever that for a man who is leading a typically healthy life, who has no disease, who is well fed and well housed, and who enjoys plenty of fresh air and exercise, alcohol is not necessary; and it has been proved again and again that "total abstainers" are capable of as much physical exertion either in the harvest-field or during a campaign as are those who make a moderate use of alcohol.

Much use has been made of alcohol by men who happen to be "living under exceptional circumstances," such as great heat or great cold. It has been conclusively proved, however, that such a use of alcohol is founded on error, and observations made on soldiers and sailors have shown that tropical heat and arctic cold are withstood by the total abstainer more easily than by the moderate drinker. The most common excuse for spirits, perhaps, is "*to keep out the cold*," but it has been proved again and again that one of the most certain effects of alcohol is *the lowering of the temperature of the body*, and that instead of enabling the body to *withstand cold* it, on the contrary, lays it open to its attacks. We must not forget that there are entire races of men who abstain absolutely from alcoholic drink, and if we turn to consider what effect this total abstinence has had, for example, on the Mahomedan population of the world, we are forced to admit that at one time or another of the world's history they have shown themselves unsurpassed in literature, in science, in art, and in war; and, if the Mahomedans do not, perhaps, hold the same preponderating position that they formerly did, no one would think of attributing their decadence to the fact of their making no dietetic use of alcohol.

It seems to us, however, hardly fair to try and make facts which are very partial in their distribution of universal application. The Mahomedans and Hindoos inhabit, for the most part, the tropical and sub-tropical regions of the earth, and their modes of life from this cause, if from no other, would not probably be suitable for our damp northern climate. Again, take many articles of diet in common use among us, and try to determine by accurate experiment whether or no they were a necessity. The task would prove very difficult. Condiments of all kinds, perhaps, cannot be considered as necessary for a healthy man. "Hunger is the best sauce," and a healthy appetite will despise the cruet-stand, but yet there is



little doubt that for the majority of us, who are very far from the natural state of crude health, the addition of a little *pepper*, or *mustard*, or *horse-radish*, enables us to eat with a relish that which our bodies cannot do without, but for which our lack of exercise and fresh air had left us no appetite. The same remark might be made about tea or coffee, and about many other things which we consume and enjoy, and which do no harm to most of us.

If tea, coffee, pepper, or mustard are not necessary for us, why do they grow? The answer might be given that although they are not absolutely *necessary* in a state of crude health, yet we are most of us the better for taking them in moderation—that they constitute, as it were, varieties of dietetic medicine, that their use has become a “second nature,” and that the human race, living as it does under conditions which are intensely artificial, is the better for their moderate employment.

We cannot shut our eyes to the fact that a majority of civilised mankind, inhabiting temperate and northern climates, hold to the opinion that fermented drinks are dietetically useful. The writer of the present article certainly holds that opinion, and he has no doubt of the value to most persons of a small quantity of wine or beer taken at meal-time. We must all have noticed that our appetite for alcoholic stimulants varies immensely. At one time we are content to quench our thirst with simple water, and at another we feel something like a craving for alcoholic or other stimulants. There is little doubt, we think, that this craving for alcohol is brought about by unwholesome modes of living. Certain it is that the notably drunken classes are such as live unwholesome lives, and follow unwholesome occupations. The *hair-dresser*, the *tailor*, and the *compositor*, following a monotonous employment in a close, foul atmosphere, are noted for their drunken habits; and those whose lives are spent in pleasanter places, amidst a variety of scenes, and in the fresh air, should rather pity than blame those who are unconsciously driven to seek a delusive compensation for the depressing influences by which they are surrounded. If we were asked to mention the one thing which induces a craving for alcohol in most of us, we should say “faulty ventilation.” Ill-ventilated theatres and ball-rooms, and close offices and workshops, are, we doubt not, directly answerable for much alcoholic excess. It is one of the writer’s duties to see hospital out-patients, and he has often remarked that the one thing which begets in him a longing for *alcoholic drink*, or for *tea*, is the sitting for two or three hours at this work, in a small room crowded with patients and others, and reeking with organic effluvia. Much of the drunkenness of English society has disappeared before the superior education to which the present generation has access. The cultivation of the mind endows a man with moral control, and leads him to appreciate his intellectual faculties too much to allow himself to get fuddled. The “three-bottle” man is happily a thing of the past, and drunkenness effectually excludes a man from anything like decent society. We have every hope that education will have a like effect upon the lower classes. We trust also that the efforts now being made to provide the poor with wholesome dwellings will diminish their temptation to seek refuge in the comparative comfort of the public-house.

*Wine*, as we hinted above, contains many constituents in addition to alcohol. Wine is a most complex body, and difficult to analyse, and no analysis gives us a

proper notion of the value of the wine, which can only be judged of by experienced persons. Besides *alcohol* (which varies from five to twenty-five per cent.), we find *ether* (which imparts to the wine its bouquet, or odour), *sugar* (varying from nothing in wines of the Bordeaux class to as much as sixty grains in the ounce in some of the Madeiras), *colouring matter*, *astringent matter*, *extractive matter*, *free acid* (chiefly due to tartaric acid, and acid tartrate of potash, or cream of tartar), and *salts*.

The free acid and the salts in wine add, there can be no doubt, immensely to its dietetic value, and the fact is generally admitted that wine is a valuable anti-scorbutic. For this reason Dr. Parkes is in favour of issuing red wine to troops during a campaign.

A great deal of the wine which comes into the English market is "fortified" to suit the English taste. This is the case with almost all the ports and sherries. The English Custom House imposes a light and heavy duty on wines, according to their alcoholic strength. Wines which contain less than 26 per cent. of proof spirit (about 13 per cent. of alcohol), pay only 1s. a gallon duty, while those which contain more than 26 per cent. pay half a crown. All wines (with very few exceptions) which pay the higher duty have been fortified.

Dr. Druitt, in his "Report on Cheap Wines," gives a few simple directions which may help a man to use his senses, and *his own judgment* when called upon to taste wine and form an opinion of its value. The points which a good wine should have are—

1. *Unity* of taste. The wine should have a taste of its own, and not strike us as being a compound of many liquids.

2. *Alcoholicity* and *generosity* of taste. A wine should not be fiery, hot, and stinging, but should impart a gentle feeling of warmth only.

3. Good wholesome wine should have a slight detectable *sourness*, which, however, must not be excessive. Only practice will enable one to distinguish between natural sourness and the sourness of acid fermentation, but there is the same difference between them that there is between the acidity of a ripe grape and the acidity of vinegar.

4. Many wines are *sweet*.

5. Wine must have *stability*, and be free from that mawkish, sickly taste which indicates a tendency to ferment.

6. Most red wines have a certain amount of *roughness*, or *astringency*.

7. A wine should have *body*, *i.e.*, should hold many things besides alcohol in solution. The fullest-bodied wines are the *madeiras*, the thinnest are the *clarets*.

8. No wine is perfect without *bouquet*, or odour, but the bouquet must be truly *vinous* in character, and not the odour of pomade. Bouquet is very easily imparted to wine, and when we find the bouquet excessive (as is some moselles) we should doubt its genuineness.

9. Another much-prized (by some) quality of wine is *softness*. Softness means absence of roughness and astringency, and indicates that the wine has been carefully made, and that time has been given for the deposit of some of the contained salts. Softness is imparted to wine by adding solutions of isinglass (gelatin), which



combines with the astringent tannic acid and falls to the bottom as an insoluble deposit. The deposit of a *very thick* crust in a wine-bottle may be taken to indicate that the process of fermentation has been rapid, or has probably been checked by the addition of spirit. Such wines possess great body and fruitiness, but require keeping for very long periods in order that they may mature.

The longer a wine is kept in cask the stronger it becomes, because the wood of the cask absorbs the watery constituents more readily than the alcoholic.

The red colour and the roughness of wine is imparted to it by adding the skins (of red grapes) and the stalks to the fermenting vat. The best wines are made from the juice of the grapes only. If the reader will only cast his eyes over the analysis we have made above of the qualities of wine, it will be evident to him that nearly every one of them—alcoholicity, acidity, sweetness, roughness, colour, bouquet, astringency, and smoothness—can be imparted by artificial means, and there is too much reason to suppose that artificial means are abundantly resorted to, and that in this country a glass of really genuine wine is an extremely rare article. The inhabitants of northern climates who make no wine of their own, and who never in their lives perhaps taste any wine which they, of their own knowledge, know to be genuine, have no means of educating their palate, and no access to standard wines of known genuine qualities. Refinement of taste is got by cultivation just as an appreciation for good sculpture or good music is got. One might, on *a priori* considerations, be certain that the tastes for wines in climates like ours would probably be debased, and coarse, and that it is debased and coarse, except among the few who by travel have been enabled to educate the palate, is a fact beyond the possibility of contradiction.

Among us, almost anything will pass for wine, provided it be sufficiently advertised and puffed. It is an acknowledged fact that a large proportion of the "sherry" which finds its way into this country has been manufactured or blended at Hamburg or Cette; the foundation of it is *spirits of wine*, the accessories vary according to the demand for *rich brown* or *pale dry* sherries. There is often no grape-juice in it.

Dr. Druitt in his "Report on Cheap Wines," says, "The following statement may be relied on as an account of the composition of port wine of the first quality. It was given to me by one who has a better right to know than most men."

#### COMPOSITIONS OF PORT WINE OF FIRST QUALITY.

To the Pipe of half-fermented *must* is added, to check fermentation :—

25 Gallons of brandy.

Say 5 Gallons of elderberry juice to colour.

„ 6 „ more of brandy.

„ 2 „ after racking.

„ 1 „ on shipment.

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39 Gallons.

76 „ of wine.

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115 Gallons = 1 Pipe.

A little consideration will show that it must be impossible to sell wine which is brought from a distant country, like Spain or Portugal, in this country at a very low figure.

In the first place, really good wine must be paid for even in the countries where it is grown. The commoner varieties are, to an English palate, far from agreeable, and are consumed merely as a table beverage, as we use beer or water here. These cheap wines would not probably bear transporting.

Now, sherry is sold in this country at fourteen shillings a dozen. Supposing this to be genuine wine imported from Spain, what must it have cost when purchased by the slipper of the farmer? Of this fourteen shillings five shillings have been paid for duty, so that the vendor has only nine shillings from which to get his profit. The cost of freight has probably been two shillings, and of bottling and corking at least another shilling. Thus six shillings are left for the expense of cellarage, dock dues, cartage, trade expenses, advertisements, and the profits of at least two persons, and probably more, through whose hands the wine has passed. The wine when it left the peninsula (if it ever did) could scarcely have been of a high class. It probably came from Hamburg or Cette, and any clever druggist could probably compound a mixture which should be quite as palatable, and perhaps more wholesome, at a twentieth of the cost.

One thing seems evident, and it is this, that a reasonable price must be paid for articles imported from distant countries, and especially for articles which are yielded in varying amounts, and which require a period of some years (at least two or three) to come to a wholesome maturity, and which during this period demand unremitting and skilled attention.

Many an Englishman recognises this fact, but he also recognises a fact no less true, and it is this, that he may give a high price and still not get a good article.

It is a very difficult thing to give the purchaser any sufficient guarantee that when he buys wine he is really buying the juice of the grape. The composition is so complex that chemical analysis is of no avail, and although the Adulteration Act has proved a great boon in ensuring the genuine quality of most articles of food, it has not been and is not likely to be of any service in the matter of wine.

We might at least, however, have some guarantee that wine is the produce of a certain district and a certain country; and it is much to be regretted that wine-growers do not seek to protect their interests by trade-marks and labels. At present it is only necessary to give a wine some absurd name, which is no indication of its source or origin, and to advertise it sufficiently with the aid of medical opinions and analysis, to be sure of a large sale and a proportionate profit. The gullible public continue to buy, without considering that a wine which year after year continues to be sold at the same price, and is always of absolutely uniform composition, can hardly have been produced in a country where the products of the vineyards are variable both in quality and quantity, where one year the grapes

“In Bacchanal profusion reel to earth,”

and the next are few and shrivelled, starved by drought or consumed by parasitic fungi.

*Beer* may, perhaps, be considered the natural drink of this country, and there is no doubt that when it is well brewed and not too strong it is a very wholesome beverage.



It is a remarkable fact that the knowledge of brewing seems almost as old as the knowledge of the fermentation of grape-juice. The writer of the article "Brewing," in the "Encyclopædia Britannica," gives some very interesting information on the antiquity of this art. The Egyptians, the Greeks, and the Romans, all manufactured a barley wine, which is mentioned by Æschylus, Pliny, and other writers. Tacitus mentions the beer-drinking habits of the Germans. The Kaffirs have made a beer from millet seed from time immemorial, and it appears that the inhabitants of Nubia, Abyssinia, China, and Russia, have had a knowledge, for many centuries, of the art of brewing. Brewing is a very ancient art in this country, and as early as the thirteenth century Burton-on-Trent became famous because of its water being so well adapted for brewing purposes.

"Mary, Queen of Scots, in the midst of her troubles, seems not to have been altogether insensible to the attractions of English beer, for when she was confined at Tutbury Castle, Walsingham, her secretary asked—'At what place near Tutbury beer may be procured for her Majesty's use?' to which Sir Ralph Sadler, governor of the castle, made reply—'Beer may be had at Burton, three miles off.'"

Beer contains many important ingredients besides alcohol. The composition of a pint (20 oz.) of beer is, according to Dr. Parkes, as follows (in addition to water):—

Alcohol . . . . .	1 ounce.
Extractives, dextrin, sugar . . . . .	1·2 ounce.
Free acid . . . . .	25 grains.
Salts . . . . .	13 grains.

The effect of the alcohol of beer we have already discussed. The extractives, dextrin, and sugar are present, it will be seen, in very large proportion, and these constitute the fattening qualities of beer. That beer is in the highest degree a fattening beverage is evident to any one who will inspect the staff of a brewery. The free acid and salts also probably give to beer some degree of anti-scorbutic power. Beer has undoubtedly some degree of nourishing power, and has more right to be regarded as a food than other alcoholic drinks. Beer varies immensely in quality. Old college ale, or audit ale, made as strong as a lavish use of malt will allow, has such a high degree of alcoholic strength, that it readily burns and flares up when thrown upon the fire. At the opposite end of the scale come the very light beers of Vienna and Munich, the alcoholic strength of which is so slight that they may be said to have no intoxicating power. The following table of alcoholic strength of different beers is taken from Dr. Pavy's work on food :—

	Alcohol Present.
Barclay and Perkins' London Porter . . . . .	5·4
London Porter (average) . . . . .	4·2
Burton Ale . . . . .	5·9
Scotch Ale (Edinburgh) . . . . .	8·5
London Small Beer . . . . .	1·28

Beer, if too strong, or if taken in too large a quantity is a very "heavy" beverage, and causes a great tendency to sleep, as the brewer's carmen dozing on their drays bear witness. There is no doubt that the inordinate beer-drinker tends to become lazy and "fat-headed," as well as corpulent in body.

The light bitter beers are very valuable drinks, and tend, in small quantities, to

increase the appetite and help digestion. Good bitter beer is to be had in plenty in England, and it is undoubtedly a far more wholesome beverage than “much-advertised” wine of doubtful composition. One of the most wholesome and pleasant of the bitter beers is that made at Pilsen in Bohemia. It is light, fragrant, and agreeable.

The adulterations of beer are very numerous, and although the excise only permits the use of malt, sugar, and hops for brewing, the retailer of beer often seeks to increase his profit by adding various articles. The beer is first watered, and then various things are added to give this weakened beer the semblance of body, strength, or bitterness. The following is a list of deleterious articles said to be added to beer, which is appended to the Licensing Act of 1872.

Cocculus Indicus.	Indian hemp.	Extract of logwood.
Common salt.	Strychnine.	Salts of zinc or lead.
Copperas.	Tobaeo.	Alum.
Opium.	Darnel seed.	

Beer which has been tampered with is never good, and the “freshness” which is the result of the fermentative process, and which is destroyed by adding water, cannot be restored again. Owing to the stringency of the licensing laws it is doubtful whether the adulteration of beer is so extensively practised as formerly was the case.

*Cider and Perry* are fermented liquors made from the juice of apples and pears. They are very wholesome, and those who drink them are said not to have the gout. They contain about 7 per cent. of alcohol, and have considerable anti-scorbutic power. It is said that they are much employed as a foundation for cheap factitious wines.

The juice of all sweet fruits is capable of being fermented, and “wine” has been and is often made from gooseberries, currants, rhubarb, parsnips, and other succulent fruits and vegetables. It is, we think, to be regretted that more attention has not been paid to the fermentation of the expressed juice of fruits other than the grape.

*Non-alcoholic beverages.*—It is a remarkable fact that most of the races on the face of the globe make use of a non-alcoholic beverage, to the employment of which they have been guided, as it were, by instinct. Tea, coffee, and cocoa are consumed by millions of people daily, and chemical analysis has shown that the active principle of these three bodies is chemically the same, although they were at first distinguished by the three names of theine (the active principle of tea) caffeine (coffee) and theobromine (cocoa).

The composition of TEA is (according to Mulder) as follows :—

	Black Tea.	Green Tea.
Essential oil . . . . .	0·06 .	0·79
Chlorophyll . . . . .	1·84 .	2·22
Wax . . . . .	0·00 .	0·28
Resin . . . . .	3·64 .	2·22
Gum . . . . .	7·28 .	8·56
Tannin . . . . .	12·88 .	17·80
Theine . . . . .	0·46 .	0·43



	Black Tea.	Green Tea.
Extractive matter . . . . .	21·36 . . .	22·8
Colouring substance . . . . .	19·19 . . .	23·60
Albumen . . . . .	2·8 . . .	3·0
Fibre . . . . .	28·32 . . .	17·08
Ash . . . . .	5·24 . . .	5·56

In the infusion of tea which we drink are dissolved certain proportions of the gum, the theine, and the tannin. The tannin is one of the distinctive ingredients of tea ; and if the tea be boiled, or if the water be allowed to remain too long on the tea-leaves, it becomes bitter, astringent, and unwholesome, from the large quantity of tannin which is taken up.

Warm the tea-pot, either by putting it near the fire or by pouring some boiling water into it. If this be not done, the infusion of tea cools too quickly, and fails to extract a due amount of the soluble ingredients of the tea. Take *fresh* spring water and boil it, and *the instant that it boils* pour the boiling water over the tea placed in the warm tea-pot. We are informed that professional tea-tasters are very particular to use only water which is *freshly boiled*. It is too often the custom to fill up the pot from the kitchen kettle which has been boiling all day, and from which all the carbonic acid has been expelled. Flat water of this kind does not make good tea. Let the tea stand for *eight minutes*, and then pour the infusion off the exhausted leaves. If the tea is to be consumed immediately, it may be poured out into the tea-cups ; but if it is to be kept hot for a long time, it must be poured into another vessel, and on no account be allowed to stand (covered with a “cozy”) upon the leaves. Such a proceeding makes the tea bitter and astringent. The water with which tea is made should not be very hard, and must on no account contain iron. The infusion of tea may be made of any strength, and the hap-hazard rule of the British housewife has been to put into the infusing pot “a tea-spoonful for each consumer and one for the pot.” This habit of infusing tea by the “spoonful” must cause the strength of the infusion to vary immensely, since some teas are, weight for weight, far more bulky than others. The space occupied by tea depends mainly on the tightness with which it has been rolled. Dr. Edward Smith has made exact experiment on this point, and has furnished the following table :—

BLACK TEAS.		
	Weight of a moderate-sized caddy-spoonful.	Number of such spoonfuls to the lb.
	Grains.	
Oolong . . . . .	39 . . .	179
Congou, inferior . . . . .	52 . . .	138
Flowery Pekoe . . . . .	62 . . .	113
Souchong . . . . .	70 . . .	100
Congou, fine . . . . .	87 . . .	80
GREEN TEAS.		
Hyson Skin . . . . .	58 . . .	120
Twankay . . . . .	70 . . .	100
Hyson . . . . .	66 . . .	106
Fine Imperial . . . . .	90 . . .	77
Scented Caper . . . . .	103 . . .	68
Fine Gunpowder . . . . .	123 . . .	57

Hence a given bulk of Gunpowder will be more than three times heavier than the same of Oolong, and twice as heavy as Flowery Pekoe.

It would of course be more exact to make tea by weight, and when tea is made in large bulk this ought always to be done.

*Coffee* in its unroasted state has the following composition:—

Caffeine . . . . .	0.8
Legumine . . . . .	13.0
Gum and Sugar . . . . .	15.5
Tannin . . . . .	5.0
Fat and volatile oil . . . . .	13.0
Woody fibre . . . . .	34.0
Ash . . . . .	6.0
Water . . . . .	12.0

The composition of coffee has a general similarity to that of tea, but it contains more gum and sugar, and very much less tannic acid.

The infusion of coffee is always made from the roasted berry. In the process of roasting some of the water is driven off, the berry swells and becomes lighter (to the extent of 25 per cent.), the sugar is turned into caramel (the peculiar principle of “burnt sugar”) and the peculiar aroma of coffee is developed. This aroma constitutes one of the chief qualities of coffee, and is that to which the beverage owes its pleasantness. As soon as roasted the coffee begins to lose its aromatic qualities, and if coffee is to be really good *it must be fresh roasted*. The habit which we have in England, of buying coffee not only roasted but often ground as well, is simply barbarous, since it is well known that coffee in such a state cannot retain its qualities for many hours. Roasting coffee is a perfectly simple process, and throughout the Continent there is not a peasant woman who is not perfectly capable of roasting her own coffee. Coffee is roasted in a cylindrical metal box, which is kept constantly revolving, in order that all the berries may be properly exposed to the action of the fire. The process of roasting should be continued until the well-known aroma is developed, and the coffee is of a chestnut colour. Care must be taken not to burn it. Coffee should not be ground until it is actually required for use. The coffee should be placed in a suitable vessel on the hob, in order that the coffee and the vessel may both get thoroughly warmed. Boiling water should then be poured upon the coffee, and allowed to stand for ten minutes. The infused coffee may then be poured off the grounds, and is ready for use. Coffee must on no account be boiled, or else the characteristic aroma will be dissipated.

Dr. Parkes recommends that the grounds left from an infusion should not be thrown away but that they should be kept until the next infusion is made, when the water required should first be boiled upon the old grounds and then poured upon the fresh coffee. In this way we extract from the coffee all that can be got by boiling, and at the same time get the aroma and pleasant qualities of the fresh coffee. Since coffee is not so rich in tannic acid as tea it does not become unpleasantly astringent and unwholesome by boiling, and Dr. Parkes’s method strikes us as a most admirable one.

Tea and coffee can hardly be regarded as foods. The amount of nutrient



matter in an infusion of tea is almost nil, but perhaps "coffee" may contain a little more. Their chief use is as a refreshing drink, and the service they render to mankind in this respect is enormous. They are powerful stimulants to the nervous system. If taken in too large a quantity they cause great wakefulness and considerable mental excitement, and even tremor of the hands. A cup of strong tea or coffee seems to cause an exaltation of the intellectual faculties, and a clearness of understanding which is most pleasurable. At the same time there is an inability to sleep, and he who habitually takes tea or coffee for the sake of driving himself towards the performance of abnormal intellectual work will undoubtedly suffer for it in the end by loss of nervous power. Tea and coffee are supposed to prevent waste of tissue, but of this there is really very little evidence. Coffee is largely used abroad as an aid to digestion, and is taken immediately after dinner.

There is no doubt that the habit of taking these nervine stimulants—tea and coffee—is one which grows on the practiser, and is as difficult to break through as the habit of smoking, or indulgence in alcoholic drinks. That a certain number of people damage themselves by over-indulgence in tea and coffee we have no doubt, but we also have no doubt that the good effected by these articles is out of all proportion to the harm, which is only quite exceptional.

The habit which obtains amongst the poor of drinking tea made by *boiling* the worst samples is utterly bad. The "tea" is, when made in this way, little more than a solution of tannic acid, and its consumption causes constipation and indigestion.

*Cocoa*, the only other body besides the two we have discussed which is used in this country for furnishing a non-alcoholic beverage, must be placed in a very different category to tea and coffee, as the subjoined analysis will show.

COMPOSITION OF COCOA (PAYEN).

Cacao butter . . . . .	48
Nitrogenous matter . . . . .	21
Theobromine . . . . .	4
Starch with traces of sugar . . . . .	11
Cellulose . . . . .	3
Mineral matter . . . . .	3
Water . . . . .	10
	<hr/>
	100

It has, to a slight extent, the stimulating power of tea and coffee, but its great value is, as a *food*, as the large amount of fat, *starch*, and *nitrogenous* matter must make evident.

In the appendix to "The Personal Care of Health," Dr. Parkes gives a few sanitary hints for working men, and we cannot refrain from giving in full his hints on the important subject of "drinks."

"If you wish to keep good health to old age, never touch spirits, and only drink one pint or a pint and a half of strong beer or two pints of weak beer with your dinner and supper. Better still if you can abstain from beer altogether, and spend the money in more food and better clothing. It is astonishing how much may be done with the money spent in beer. Instead of beer, there are various agreeable drinks. If a little rice is washed in cold water, and then is boiled in a good deal of

water, the fluid, if a little sugar is added, is a pleasant and nutritious drink. It is much used in India by our men. In winter, it may be taken warm, in summer cold; and in summer, if you buy an ounce of tartaric or citric acid, which is very cheap, and put a small quantity of this in rice-water, a very refreshing beverage is obtained. You will soon learn when you have got acid enough; but it should not be too acid; only just enough to be pleasant. The boiled rice, of course, must be used in food.

“If you live in the country, and can get skimmed milk, nothing can be better both for you and your family than to drink this at dinner and supper. It is well always to boil it, and a little sugar makes it still more agreeable; no acid must be added to this.

“If you have a garden, and can get either currants or raspberries, the pressed juice boiled in water, and then mixed with a little tartaric acid, and bottled, will keep a long time, and is a very wholesome and agreeable beverage. A little oatmeal boiled in water, and then a little sugar added, also gives a good drink. So that you can have a choice of beverages, if you find the want of something besides water. But if you can get to like plain water, you are a lucky man.

“When you have any heavy work to do, do not take either beer, cider, or spirits. By far the best drink is thin oatmeal and water with a little sugar. The proportions are a quarter of a pound of oatmeal to two or three quarts of water, according to the heat of the day, and your work and thirst; it should be well boiled, and then an ounce or an ounce and a half of brown sugar added. If you find it thicker than you like, add three quarts of water. Before you drink it, shake up the oatmeal well through the liquid. In summer drink this cold, in winter hot. You will find it not only quenches thirst, but will give you more strength and endurance than any other drink. If you cannot boil it you can take a little oatmeal mixed with cold water and sugar, but this is not so good; always boil it if you can. If at any time you have to make a very long day, as in harvest, and cannot stop for meals, increase the oatmeal to half a pound or even three-quarters, and the water to three quarts if you are likely to be very thirsty. If you cannot get oatmeal, wheat flour will do, but not quite so well. It is quite a mistake to suppose spirits give strength; they give a spirit to a man, but that goes off, and if more than a certain quantity is taken, they lessen the power of work.

“For quenching thirst, few things are better than weak coffee and a little sugar. One ounce of coffee and half an ounce of sugar, boiled in two quarts of water, and cooled, is a very thirst-quenching drink. Cold tea has the same effect, but neither are so supporting as oatmeal. Thin cocoa also is very refreshing, and supporting likewise, but is more expensive than oatmeal.”

#### WATER.

Water must be regarded as the very basis of all sanitation. Without a good supply of water, cleanliness and healthiness is impossible, and it should be the first duty of individuals and communities to obtain a good supply of this, the most



necessary, perhaps, of all the so-called necessities of life. The purposes for which water is required are manifold, and in the following list are comprised the more important of them :—

Drinking.	Washing household utensils.
Cooking.	Cleansing of houses.
Personal ablution and bathing.	The watering of streets.
Washing clothing.	The flushing of sewers.

It is a very difficult matter to calculate the proper amount of water which should be delivered per head of population in a town or city, and the amount required in different places will necessarily differ according to the nature of the industries carried on, &c., since some require far more water than others. The extinguishing of fires, and the supply of public fountains, also make considerable demands on the supply. Ancient Rome (the aqueducts for the supply of which are among the most interesting relics of antiquity) was noted for its liberal supply of pure water, and it has been calculated that more than three hundred gallons per head of population was daily poured into the city. A large part of this was doubtless for the supply of the public baths, of which there were great numbers, and on a scale of magnificence of which it is hard for us to have any adequate conception. The two chief aqueducts of ancient Rome, the *Aqua Claudia* and the *Anio Novus*, were respectively forty-five and sixty-two miles in length. They were conveyed partly under and partly above ground, and about six miles from Rome they were united, and were supported in separate channels on a magnificent series of arches, which in places were one hundred and nine feet in height. Besides these principal aqueducts there were twelve others for the supply of Rome. The most wonderful, perhaps, of the Roman aqueducts is to be seen at Nismes, under the name of the Pont du Gard. It is estimated that the height of this colossal work (which consists of three superimposed rows of arches) was in places as much as one hundred and eighty feet.

The Greeks, no less than the Romans, seem to have paid great attention to this all-important matter of water-supply. We are told, for instance, that, in the year 625 B.C., Polycrates, the tyrant of Samos, engaged a famous engineer, Eupalinus, to construct water-works for the city. The main difficulty to be overcome consisted of a hill between the source of supply and the town, and through this hill Eupalinus cut a tunnel for the water four thousand two hundred feet long, eight feet broad, and eight feet deep. Again, between the town of Syracuse and the island of Ortygia, the water was conveyed in a tunnel *under the sea*. These works of antiquity certainly put to the blush many modern populations, whose apathy in the matter of pure water is certainly as surprising as it is disgraceful.

Although the ancient Romans were perfectly acquainted with the laws of hydrostatics, and knew that water would always seek its original level, this principle was never used in their aqueducts, because they had no material from which they could manufacture pipes of sufficient size and sufficient strength to withstand the pressure of the water. The introduction of cast-iron pipes in the present day has done away with the necessity of maintaining the level of the water on enormous bridges, and has very much diminished the cost of constructing water-works.

New York has perhaps the best water supply of any modern city. In 1872, when the population of the city was about 1,000,000 persons, the water supply was estimated at 88,000,000 gallons per diem. Since 1872 the reservoirs for the supply of the city have been immensely enlarged, and at present they are capable of storing 5,000,000,000 gallons of water.

The city of Glasgow is perhaps the best supplied city in the United Kingdom, and the aqueduct by which the municipal authorities placed Loch Katrine in immediate connection with their city is justly looked upon as one of the greatest engineering works of modern times. Loch Katrine is capable of storing nearly 6,000,000,000 gallons of water, and the distributing reservoir at Mngdock, eight miles from Glasgow, will hold 548,000,000 gallons. The service pipes deliver 50,000,000 gallons per diem, which, if we take the population of the city at 700,000, is more than 70 gallons per head. The cost of the works was as under, and when we consider the paramount importance of the operation, the amount cannot be considered high.

	£
Work at the locks . . . .	36,000
Aqueduct, $25\frac{3}{4}$ miles long . . . .	468,000
Mugdock reservoir . . . .	56,000
Main pipes, 36 inches in diameter . . . .	123,000
Distribution in the city . . . .	78,000
Total for works . . . .	£761,000
Land and compensation . . . .	70,000
Parliamentary expenses, engineering, &c. . . .	87,000
	£157,000
Total . . . .	£918,000

The City of Vienna is now supplied by an aqueduct fifty-eight miles long, from the Kaiserbrunn Spring, situated in the Styrian Alps, 1,146 feet above the level of the Danube. The cost of these works (opened in 1873) was about £2,000,000 sterling.

Works are now in course of construction for the supply of Paris with potable water, since the present sources, although well suited for street cleansing and other municipal purposes, are considered too impure for drinking. The new supplies for Paris are to be taken from certain tributaries of the Marne, running through chalk districts, and also from wells sunk especially in the chalk beds.

In our introductory chapter on hygiene, we have spoken of the water-supply of London in the middle ages and down to the time when Sir Hugh Middleton earned the everlasting gratitude of his fellow-citizens by bringing the New River to Islington.

The compilers of the "Food Inventory," of the South Kensington Museum, make the following statement as to the present water supply of London:—

"London is, at present, supplied with water by nine companies, who deliver about 107,000,000 gallons daily. Some idea may be formed of the vastness of this supply by a comparison of its volume with some well-known magnitude. If it were contained in a reservoir having a floor area equal to that of Westminster Hall, the walls would require to be carried to the height of 1,070 feet, or more than three



times the height of the Victoria Tower, to enable it to contain the water which is daily distributed in the metropolis. Five of the water companies abstract about one-half of the total supply from the Thames, two withdraw about 42,000,000 gallons from the River Lea, and the remainder is pumped by two other companies (the Kent and South Essex Companies) from artesian wells sunk into the chalk of the Thames basin. Such is the present volume of water daily supplied to London and its suburbs; what will be the amount required twenty years hence it is difficult to estimate, but if the annual rate of increase since 1850 be continued, it can scarcely be less than 150,000,000 of gallons; for, in 1850, the gross daily quantity delivered was only 44,500,000 gallons, in 1856 it had reached 81,000,000 gallons, whilst, as above stated, it is now 107,000,000 of gallons."

The number of gallons supplied daily per head of population by each of the chief companies is thus estimated by Dr. Parkes :—

New River	.	.	.	.	.	22
East London	.	.	.	.	.	22
Chelsea	.	.	.	.	.	33.8
West Middlesex	.	.	.	.	.	30
Grand Junction	.	.	.	.	.	34
Southwark and Vauxhall	.	.	.	.	.	21
Lambeth	.	.	.	.	.	34

Although the water supply of London does not appear very inadequate *upon paper*, it is so in reality, and among the poorer parts of the town there are thousands of houses in which the supply is scanty and of bad quality. Previous to the year 1855, much of the water was taken from the Thames, below Teddington, *i.e.*, from the portion of the river affected by tides, and that, too, at a time when the Thames was more completely a sewer than it is at present.

By "The Metropolitan Water Act" of 1852, the companies were compelled, on and after August 31st, 1855, (1) To take water from the Thames only above Teddington Lock. (2) To have covered reservoirs if situated within five miles of St. Paul's. (3) To distribute their water through covered pipes. (4) To filter all water supplied for domestic use. (5) To see that steam engines and furnaces used at the water-works should, as far as possible, consume their own smoke.

An analysis of the water supplied, before and after this Act had come into use, showed that after it had been complied with a *very considerable diminution of organic matters was observed in the water*. This difference was, in one case, as much as three grains in the gallon.

*Pure water* is a rare article, and is only to be got by a careful distillation. The rain which falls in an open country situation is almost pure water, but the rain of towns very quickly becomes impure, and as it falls through the air it dissolves carbonic acid and ammonia, and also portions of the solid, but impalpable, dust which is always floating in the atmosphere. Water also dissolves a greater or less proportion of the earth's crust through which it flows, or with which it is in any way in contact. All spring or lake water is a solution more or less concentrated of mineral matters, but provided the mineral matters are not present in undue quantity, no harm results from their presence. These mineral matters consist

chiefly of carbonates and sulphates of lime and magnesia, and give to water what is known as its *hardness*. The hardness is in direct proportion to the amount of these salts in solution.

The most important point to determine about water is the amount of contamination it has suffered from organic refuse, such as sewage, manure, and waste organic matters. All organic matters contain nitrogen and carbon, which become oxidised by the waters into carbonic acid, nitrates, and nitrites. Free ammonia when present, also shows that organic matters have been mixed with the water. These bodies are to be regarded as the skeletons of decomposed sewage or manure, and by calculating the amount of nitrogen contained in the water the chemist is enabled to calculate the amount of *previous sewage contamination* to which the water has been subjected. "Such *previous organic contamination* may be conveniently expressed in parts of average filtered London sewage, which if thus completely oxidised in a river, would yield a like amount of nitrogen in the form of nitrites, nitrates, and ammonia."

"The result of the examination of various waters contained in the following table further illustrates this point:—

PREVIOUS SEWAGE OR MANURE CONTAMINATION IN 100,000 PARTS OF VARIOUS WATERS.

Names of Waters.	Ammonia.	Nitrogen as Nitrates and Nitrites.	Previous Sewage Contamination.
Thames water as delivered in London . . . . .	·002	·234	2,062
Water delivered by Kent Company . . . . .	·001	·408	3,770
Water supplied to Worthing . . . . .	·000	·426	3,940
Water delivered by South Essex Company . . . . .	·006	·848	8,205
Shallow well at Leyland, near Preston . . . . .	·003	2·466	24,366
Shallow well at Ledbury . . . . .	·001	1·575	15,440
Shallow well at Redhill . . . . .	·002	1·446	14,160
Pump at Aldgate . . . . .	—	—	38,080
Pump at Minories . . . . .	—	—	57,060
Pump at Leadenhall Market . . . . .	—	—	57,370
Pump at St. Nicholas Olave Churchyard . . . . .	—	—	75,640
Well in the Rue Traversine, Paris . . . . .	—	—	299,780
Royal Institution well water . . . . .	·001	4·355	43,240

The above results show the greatest previous sewage contamination precisely in those cases where it would be predicted; thus the shallow well water of Leyland, near Preston, consists almost entirely of the drainage from cesspools and market gardens, the latter being heavily manured with night soil, farm-yard manure, and guano. It need, therefore, excite no surprise that nearly twenty-five per cent. of this water has been in a condition equivalent to average London sewage. The quality of the waters taken from the City pumps and from the well in the Royal Institution needs no comment; these shallow wells are now recognised as being fed by oxidised and somewhat diluted sewage. But in the well of the Rue Traversine, in Paris, this kind of contamination reaches, perhaps, its maximum. The cesspool system is still in full activity in Paris, and the soil of that city is saturated with liquid manure of such a strength that one gallon of it is equivalent to three gallons of average London sewage.—(*South Kensington Food Catalogue.*)



The Registrar-General publishes monthly the analysis of the waters supplied to the metropolis. For example, the following table shows the analytical results for October, 1868 :—

RESULT OF ANALYSIS EXPRESSED IN PARTS PER 100,000.

Description.	Total Solid Impurities.	Organic Carbon.	Organic Nitrogen.	Ammonia.	Nitrogen as Nitrates and Nitrites.	Total Combined Nitrogen.	Previous Sewage Contamination.	Hardness.
<b>METROPOLITAN WATERS.</b>								
<i>Thames Waters.</i>								
Chelsea Co.'s Water	29·2	·213	·040	·002	·337	·379	3,070	21·6
West Middlesex „	25·6	·205	·019	·001	·159	·179	1,280	19·4
Southwark „	33·6	·273	·042	·002	·227	·271	1,970	19·5
Grand Junction „	29·6	·236	·039	·002	·269	·308	2,370	20·8
Lambeth „	30·8	·225	·035	·002	·435	·472	4,050	20·6
<i>Other Sources.</i>								
New River Co.'s Water	25·8	·050	·013	—	·190	·203	1,580	21·1
East London „	24·4	·061	·019	—	·075	·094	430	19·3
Kent „	40·2	·034	·006	—	·396	·402	3,700	27·0
<b>PROVINCIAL WATERS.</b>								
Glasgow Water	3·0	·161	·011	·001	·000	·012	0	0·3
Lancaster „	3·5	·157	·001	·001	·036	·038	50	0·1
Manchester „	6·2	·183	·009	·006	·025	·039	0	3·7
Preston „	14·7	·515	·040	·003	·001	·049	0	6·7

The table is to be read thus :—100,000 lb. of Chelsea water contained 29·2 lb. of solid impurity ; the organic matter constituting a portion of this impurity contained ·213 lb. of carbon, and ·04 lb of nitrogen. This solid impurity also contained ·337 lb. of nitrogen in the form of nitrates and nitrites, besides ·002 lb. of ammonia, while the total amount of *combined* nitrogen in every form was ·379 lb. The above quantity of water supplied by the Chelsea Company had been, after its descent to the earth as rain, contaminated with sewage or manure matter equivalent to 3,070 lb. of average filtered London sewage.

The above table conclusively shows that much of the water which we get in London has, prior to our drinking it, been contaminated with sewage matter. When we think that a great part of it is taken from the Thames, a river which is recognised as the legitimate sewer for the populations between its sources and Richmond, this fact is not to be wondered at. The best water which the Londoners get at present is that which they owe to the enterprise of Sir Hugh Myddleton, and that which comes from the chalk wells of the Kent company. It is the opinion of many experts that the water supply which could be obtained from the chalk formation round London would prove more than sufficient, at least for drinking purposes, for the whole population.

This mention of the “chalk” formation leads us to speak of another property in water—viz., hardness. Hardness depends on the fact that the water holds in solution large quantities of the salts of lime and magnesia, and a reference to the above table will show that the water from the chalk wells of the Kent Company is the hardest

which comes into London, although the whole of the London water is very hard and in marked contrast in this respect to the water of Glasgow and Lancaster. Those salts which cause the hardening of water form insoluble curdy compounds with soap, and these hard waters will, consequently, not form a lather until all the salts contained in them have been precipitated by admixture with the soap. Hard waters are not, to any extent, injurious to health, but they are often wasteful when employed for domestic and other uses. The waste of soap in London from washing in hard water must be enormous, although the previous boiling of the water will serve to precipitate many of the hardening salts on to the sides of the boiler or kettle in the form of a crust. Hard waters are injurious to boilers because of the crust which they leave upon them. They are pleasant to drink, and are generally clear and sparkling.

Besides these nitrates, nitrites, and ammonia, and salts of lime and magnesia which the water holds *dissolved* in it, and which are not recognisable by the eye or any of the unaided senses—water is liable to contain *suspended* matters. Water may be muddy or cloudy, and this condition may be due to the admixture with it either of mineral or organic substances, or of both.

The microscopic examination of water is scarcely less important than the chemical examination, and may reveal, perhaps, that the muddiness is due entirely to portions of mineral matter, or that it contains animal or vegetable matters, which tell their own tale. Scales from the skin or bowels (the so-called epithelium) have been found in water, and this shows clearly that the water has been fouled by human excrement. Portions of vegetable or animal tissues which have been used for food may also be found. Animal and vegetable tissues used for clothing (fibres of wool, cotton, silk, linen) are also very indestructible, and last a long time in water, and these, again, point to the fact that the water had been fouled by human agency. Waters rich in organic deposits are generally rich also in nitrates and nitrites and ammonia, but the converse does not hold good, and a water may give abundant chemical proof of previous sewage contamination and at the same time be absolutely free from suspended matters, present a sparkling and enticing appearance, and be as pleasant to the taste as to the eye.

Among the deposits in water are to be recognised various low forms of life, both animal and vegetable, and their presence shows that *the water is rich enough in dissolved matters to keep them alive*. Neither plants nor animals can live entirely on minerals, but they flourish on organic matter, and these waters, rich in nitrogen, form a most fruitful soil for the growth of low organisms. In this fact lies the danger of consuming these waters, which show signs of *previous sewage contamination*, for although at any one time they may be perfectly free from organic matter, yet, if either the germs of plants or animals fall into them such germs are liable to increase and multiply, especially in warm localities, with the most stupendous rapidity.

Now the idea is very prevalent, an idea which has neither been proved nor disproved, that the poisonous and contagious elements of certain diseases, such as cholera and typhoid fever, consist of organic germs, perhaps of the same nature as the low forms of vegetable fungi. Now if these germs find their way into drinking water, and so into the body of another person, the disease is conveyed from one to



the other, and there is not a shadow of a doubt that both these diseases have been conveyed through drinking water in this way. There is also no doubt that these disease-carrying waters have often been shown to be very rich in nitrates, nitrites, and ammonia, and it is at least a safe and convenient theory to hold, although by no means proved, that these waters afford a rich soil for these germs, in which they increase and multiply, and on this account they are highly dangerous and to be avoided at all costs. The question naturally arises, *How are we to get water which shall be free from previous sewage contamination and fit to drink?* Obviously, the first thing is to select a suitable source, and such sources are found in places which are removed from populous districts, and in which the water accumulates at a short interval after its descent as rain or snow. High mountain lakes are admirably suited as sources of water supply. The subterranean water-beds are also perfectly safe, provided they be situated at a sufficient depth, and accordingly both in Europe and America there are numerous instances of cities being supplied with an abundance of never-failing water, entirely from artesian wells, penetrating in some cases 2,000 and 3,000 feet through the earth's crust to the lower water-bearing strata. Water from these deep artesian wells is often warm, but this is a matter of small moment. It is necessarily absolutely free from organic impurities of all kinds. Rivers form the natural drains for the surface water of the district through which they flow, and if these districts be populous, they invariably receive sewage as well as surface water. Rivers at any distance from their source are therefore dangerous as sources for water. Lakes, too, having densely populated shores, are to be regarded as unsuitable water sources. The same objection holds good with regard to surface wells. Surface wells owe their water to the drainage of the surrounding soil, and if the surrounding soil be largely impregnated with organic matter—as certainly is the case in cities—this organic matter, and the nitrates, nitrites, and ammonia resulting from it, will certainly find its way into the water. In one of the tables we have given, it will be observed that the water from the surface wells supplying Aldgate pump, the Minories pump, and other similar pumps, showed an amount of previous sewage contamination very far in excess of the water from the Thames. Not only are these surface wells impregnated with the soluble matter in the surrounding soil, but they are liable to be impregnated by leakages from neighbouring sewers. Surface wells are therefore undesirable as sources of water in populous districts, and where they are unavoidable, care should be taken to sink them at a distance from evident sources of contamination, such as sewers, dung-heaps, and grave-yards.

A suitable source for water supply having been obtained, the next point is to insure the continued purity of the water until it is distributed to the inhabitants. All aqueducts and reservoirs should be protected from meddlesome interference, and, especially in populous towns, it is often necessary to completely cover in the storing reservoirs. The distributing pipes should be of cast iron, or glazed earthenware, the former being the preferable material, and where house-cisterns are used, they should be of iron also, and should be provided with covers to prevent impurities of various kinds from falling into the water.

*Lead* is a dangerous material from which to make water-pipes or cisterns,

since many waters dissolve lead, and thus become highly poisonous. The purest waters dissolve lead most readily. Rain-water, and the pure water of Loch Katrine with which Glasgow is supplied, very soon get impregnated with lead, while the hard waters, such as we have in London and the south of England, generally have but little action on lead. It is safer, however, never to use lead for the conveyance or storage of water.

Water very often gets fouled after its arrival at the house where it is to be consumed. This especially happens in the dwellings of the poor, where the cisterns are always neglected, are never cleaned, and seldom have covers to protect them from impurities. In one of the reports of the "*Lancet* Sanitary Commission" on the dwellings of the poor in Southwark (June 13, 1874), a description is given of the water supply in *Wootton Place*. The water stand-pipe in the court had been broken for three weeks.

"'Have you any other water supply?' we inquired of a woman standing at her door. 'Oh, yes, there is a butt over the closet in the back yard, but it is so full of flies we are afraid to drink it.' This water-butt was certainly a sanitary curiosity. It was placed over the closet, and was out of the reach of those who will give themselves no trouble, even for their own convenience. Climbing to the roof we found that the butt had no cover, and on probing it with a walking-stick, hooked out (1) a child's chemise, (2) an old bit of ragged muslin, (3) an old beer-can, and on stirring it up the water became turbid from the amount of suspended matter. A little of it which we took away has been subjected to microscopic examination, and was found to contain a perfect museum of 'creeping things innumerable,' and vegetable products as well. We do not imagine that our examination was anything approaching to an exhaustive one, but we found fine specimens of cotton, wool, hair, and human epithelium, water-fleas, paramæcia, synedra ulna, anguillula fluviatilis, confervoid filaments, mycelium, and spores of fungus, and very many other curiosities that we have not been able to christen."

This is a fair sample of the neglect to which cisterns are subject, and in this respect the rich are often little better off than their poorer neighbours.

The following facts, taken from the report on the cholera epidemics of 1849 and 1854 will show the influence of the water supply on those epidemics:—

Epidemic cholera raged in England in 1848-49 and 1853-54, and the deaths from cholera and diarrhœa were, in these two epidemics, 84,079 and 58,760 respectively. Subtracting 4,000 for the ordinary deaths from diarrhœa, we get 135,000 deaths as the total of these two epidemics.

The London population, spread over an area of 78,000 acres, is divided into thirty-six districts and 135 sub-districts, and in every one of these distinct sections of the population deaths from cholera occurred in 1849 and 1854, except in the smallest—Dulwich, where, however, one person died of cholera in 1849.

In the six districts which were (in 1849) supplied with water taken from the Thames at Kew, fifteen in 10,000 died of cholera. In the twenty districts supplied by the New River—*i.e.*, with water from springs, from the Lea, and the Ravensbourne, forty-eight in 10,000 died of cholera. In the twelve districts supplied with Thames water taken between Battersea and Waterloo Bridges, 123 in 10,000 died of cholera.



The Lambeth Company, which in 1849 derived its water from the Thames at the part where it is most impure, in 1854 derived its water from a point above the tidal flow.

The Southwark Company in 1854 supplied the most impure water.

Bermondsey, one of the south districts of London, was (1854) exclusively supplied with the impure water, and the deaths by cholera were more numerous in 1854 than they were in 1849; while in the parish of Lambeth, supplied partly by the Southwark and partly by the Lambeth Company, the mortality was much lower than it was in 1849.

The pipes of the two companies, which were once in active competition, often run down the same streets and through the same sub-districts, so that alternate streets or houses in the same sub-districts were supplied with the pure and the impure water.

Dr. Snow found that in the seven weeks ending August 26, 1854, of 600 deaths from cholera, 475 happened in houses supplied by the Southwark Company; eighty-nine in houses supplied by the Lambeth Company; thirteen in houses supplied by pumps, wells, and springs; eight in houses which derived their water directly from the Thames and from ditches.

In six weeks there were fifty-seven deaths in every 1,000 houses supplied by the Southwark Company, and eleven in every 1,000 supplied by the Lambeth Company.

Again, in 26,107 houses which derived their water from Ditton (by the Lambeth Company), 313 deaths from cholera occurred in ten weeks; in the 40,046 houses that received the impure water of the Southwark Company, 2,443 persons, it was ascertained, died from cholera in the same time. The deaths in the latter district exceeded by nearly 2,000 the deaths that would have occurred if cholera had only been as fatal as it was in the houses that derived their water from Ditton.

In the district of Soho the cholera raged with great fury, and the prevalent belief was that its spread was due in a great measure to the water from a surface-well in Broad Street, known as the Broad Street Pump. The Report says:—

“We now come to the second prevalent opinion—viz., that the impure condition of the water in the Broad Street pump was the main cause of the disease. As to this, we are bound to say that there are some cases of disease which we find ourselves unable to explain upon any other hypothesis than that of the deleterious influence of the water.

“Two such cases which came under our observation are exceedingly interesting, and as they are probably the most important which have been brought forward in connection with this question, we think it right to state them at length.

“Mr. E. a percussion-cap manufacturer, has his premises at 38, Broad Street, but lives with his mother at West End, Hampstead; this lady being partial to the water from the Broad Street pump, used to have a supply sent to her, and on *Thursday*, the 31st of August, had some sent up to her as usual; of this she partook freely, as did also a niece who was on a visit to her; a servant in the house partook more sparingly. On *Friday*, September 1st, Mrs. E. was seized with cholera, and died on *Saturday*. On *Sunday*, the niece returned to her own residence at Islington, was attacked by cholera the same or following day, and died; the servant had a slight attack of diarrhœa.

“There had been no case of cholera in West End previously, nor up to the period of our inquiry some weeks after, neither had there been any case of cholera in the part of Islington where the niece resided. Mrs. E. had not been in the neighbourhood of Broad Street during the past year, nor, so far as information could be obtained, in a locality where cholera prevailed, certainly not for a week previously, as during that period she had not extended her walks beyond her own neighbourhood to Finchley Road, &c.

“The only indirect communication which could be traced between her and any cholera patient was through the medium of her son, who went daily to his manufactory at Broad Street, and had frequent communications with one of his men who resided on the premises, and was suffering from an attack of cholera, from which he recovered; Mr. E., however, being in no way affected by the disease.

“Mr. E. rarely drank the water from the pump, but the water-bottle in his bedroom being occasionally filled with it, Mr. E. had frequently remarked, that after being drawn 48 hours, it had a most unpleasant taste and flavour, as if dead mice were in it.

“Again, Mr. W., of Brighton, had been summoned to see his brother, attacked by cholera, at No. 6, Poland Street; on arriving there, and finding his brother dead, he declined to see the body, and partook of a slight luncheon of rump steak, together with a little cold brandy and water, which water was from Broad Street pump; he then went to Holford Square, Pentonville, was seized with cholera the same night, and died.

“At 10, Cross Street, where eight deaths from cholera had taken place, one of the survivors stated that they had been in the habit of drinking water from Marlborough Street pump till within a day or two of the outbreak, when, finding it exceedingly unpleasant, they sent for some from Broad Street.

“In many of the cases investigated by us, it was proved that the individuals had been in the habit of using that water. Many mechanics working in the district, and who usually drank of the water, were attacked by cholera at their own houses, situated at a distance. For instance, at Mr. Ash’s artificial tooth manufactory, 8 and 9, Broad Street, seven such cases occurred, one of the men having been visited by us at his house in Seymour Street, St. Pancras, where cholera was not prevalent. On the other hand, our tables will equally show many instances in which persons drinking this water either were never attacked, or recovered when attacked; and many in which deaths in the infected districts occurred, of persons who were not in the habit of using this water, whilst the range of the disease extended beyond the limit within which the water from the pump was drunk.

“Two remarkable instances, where a large number of people living or working in the centre of the district escaped from cholera, deserve particular notice. The workhouse, in Poland Street, lost only five of its inmates out of 535. The inmates had not used the water of the Broad Street pump, having a pump-well on the premises in addition to being supplied by the Grand Junction Company.

“The other case is the brewery in Broad Street, where eighty men were employed; none of the men working there having died of cholera, and none of them, as far as could be ascertained, having drank water from any of the street pumps, as there is a deep well in the brewery in addition to the supply from the New River.



"The alleged reason for the deleterious effects of the pump water is the presumed percolation of the sewage into the pump-well; but a careful examination of the latter has failed to reveal any defect in the brickwork through which contamination could take place. Nevertheless, a permeation might take place to a slight extent, without discovering the precise spot where it took place, and certainly such an occurrence appears by no means improbable, when we consider the close proximity of the sewers to the well, independent of the percolation which may take place from the imperfect house drainage in the neighbourhood, several necessities, with cesspools, being situated in the areas within a few feet of the well, and on a higher level.

"The sewer was ten feet from the well at a depth of twenty-three feet, the well itself being twenty-eight feet deep.

"To show how frightful the pestilence was in the neighbourhood of the pump, we may take the following passage from a report made by Mr. Whitehead, one of the curates of the parish:—

"'If a person were to start from the western end of Broad Street, and after traversing its whole length on the south side from west to east, to return as far as the brewery, and turn, going down Hopkins Street, along Husband Street, and up New Street, to end by walking through Pulteney Court, he would pass successively forty-five houses, of which only six escaped without a death.' According to a calculation based upon the last census, those forty-five houses contained a population of about 1,000; out of that number 103 perished by pestilence.

"The water from the Broad Street pump is thus described:—

"'This water was clear and bright, the only living organic productions contained in it were rather many animalculæ of the genus monas, three or four small animalculæ, like a species of amphileptus, and a few ova cases; the animalculæ were, however, present in sufficient quantity to show that the water could not be considered pure.' An analysis showed that it contained 92·06 grains of solid impurity to the gallon, of which 7·8 grains were due to organic matter and nitric acid."

The Southwark and Vauxhall Company's water contained 3·560 grains of organic impurity to the gallon. The microscopic appearances of the water are thus described:—

"These waters actually swarmed with living organic productions of various kinds, the majority of the different kinds being identical with those found in the Thames at the point from which this company obtains its supplies. Amongst those were certain species of diatomaceæ, ordinarily found only in salt or brackish waters. This occurrence of these diatomaceæ clearly shows that a portion of the sea-water makes its way up the Thames as far as the source of supply of this company and the Chelsea Company. Coupling this fact with the large number of living organic productions contained in it, it is clear that this is a highly impure water, and is wholly unfit for use as a beverage. In some of the samples examined, portions of husks of wheat, cells of potato, and other vegetable substances, starchy matter, and fragments of striped muscular fibre were met with, demonstrating clearly the fact of the contamination of the water with faecal matter derived from the sewers."

Not only does it amount almost to a certainty that cholera is often, if not always,

spread by means of fouled water, but the certainty is no less that the most common of our endemic diseases—typhoid fever—is spread in a similar way; and the instances are now so numerous and so well-established, that we do not deem it necessary to trouble the reader with long details. It is not too much to say that in every case of typhoid fever the source of the water supply should be the first matter inquired into. *Diarrhœa* is frequently caused by impure water; and the impregnation of the water with sewer gas seems the most common cause. This impregnation is frequently brought about by having the supply-pipe of the water-closet in direct communication with the cistern used for storing the drinking-water. In this way the sewer gases from the soil-pipe of the closet ascend, and are absorbed by the water in the cistern. The water supply for the water-closet ought always to be derived from a cistern other than that which holds the drinking-water.

A scanty supply of water influences the health of communities in two ways. In the first place, personal cleanliness becomes a matter of difficulty, and parasitic and other diseases of the skin become general.

Secondly, the cleanliness of towns and habitations becomes a difficulty. If there is not much rain, the air is not washed of the impurities which float in it, the sewers are not flushed, and zymotic diseases and *diarrhœa* generally make their appearance.

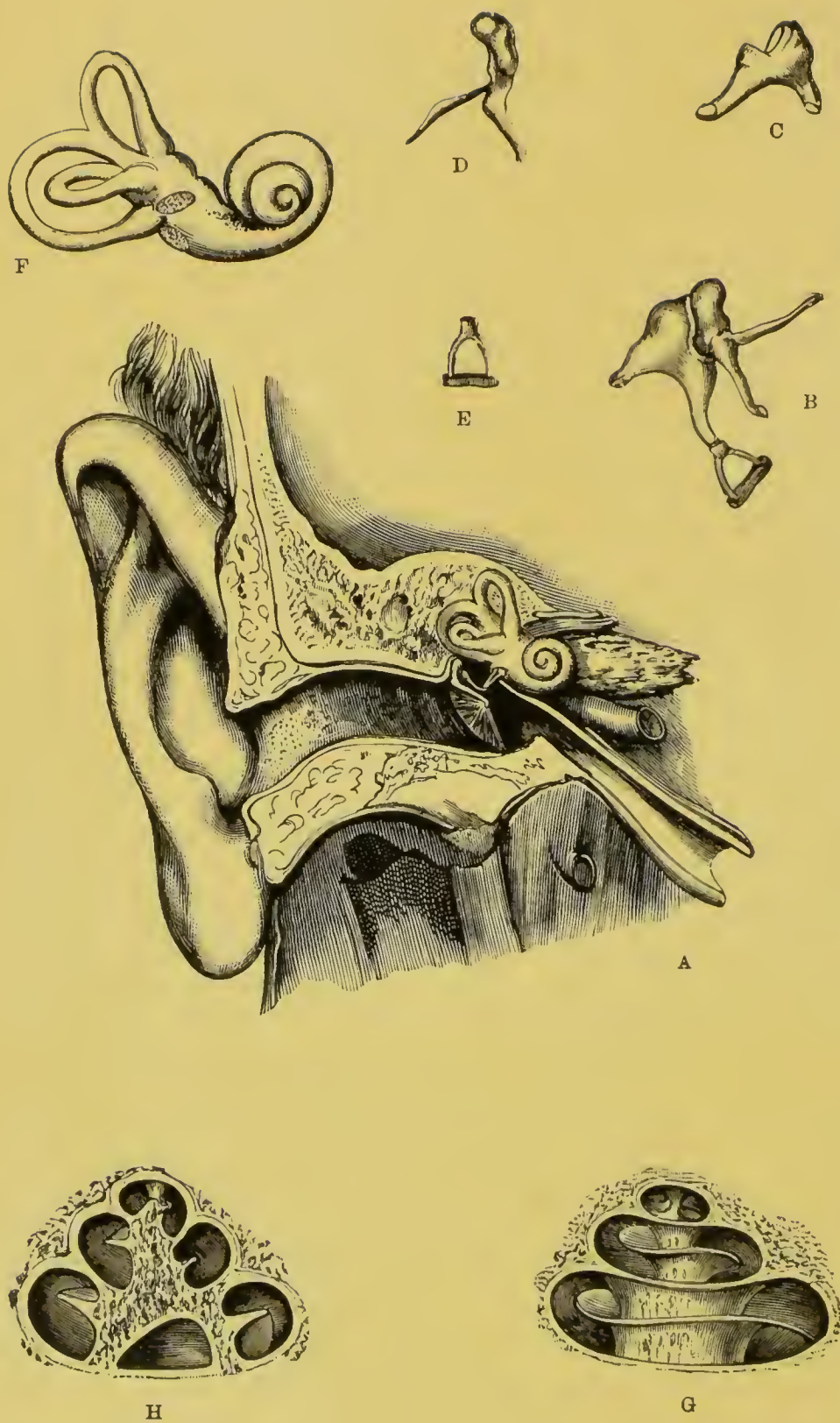
The influence of impure water in spreading certain epidemic diseases is thus described by Mr. Simon, the medical officer of the Privy Council, in his report on the cholera visitation of 1866:—

“It cannot be too distinctly understood that the person who contracts cholera in this country is *ipso facto* demonstrated with almost absolute certainty to have been exposed to excremental pollution; that what gave him cholera was (mediately or immediately) cholera contagium discharged from another’s bowels; that, in short, the diffusion of cholera among us depends entirely upon the numberless filthy facilities which are let exist, and especially in our larger towns, for the fouling of earth and air and water, and thus secondarily for the infection of man, with whatever contagium may be contained in the miscellaneous outflowings of the population. Excrement-sodden earth, excrement-reeking air, excrement-tainted water, these are for us the causes of cholera. That they respectively act only in so far as the excrement is cholera excrement, and that cholera excrement again only acts in so far as it contains certain microscopical fungi, may be the truest of all true propositions; but whatever be their abstract truth, their separate application is impossible. Nowhere out of Laputa could there be serious thought of differentiating excremental performances into groups of diarrhœal and healthy, or of using the highest powers of the microscope to identify the cylindro-tænium for extermination. It is excrement, indiscriminately, which must be kept from fouling us with its decay.

“And thus it is that my practical advice remains substantially what it has been for years. The local conditions of safety are, above all, these two:—(1) that, by appropriate structural works, all the excremental produce of the population shall be so promptly and so thoroughly removed that the inhabited place, in its air and soil, shall be absolutely without faecal impurities; and (2) that the water supply of the







## EAR AND LABYRINTHS.

A. The organ of hearing on the right side.  
 B. Bones of the tympanum enlarged.  
 C, D, and E. The same separated (C, Incus ;  
 D, Malleus ; E, Stape).

F. Cast of interior of labyrinth.  
 G. The cochlea laid open.  
 H. Median section of ditto.



population shall be derived from such sources, and conveyed in such channels, that its contamination by excrement is impossible.

“What good results are got even by rough approximation to those sanitary standards has already been abundantly shown here. The way in which the southern districts of London, with their three-fourths of a million of population, have gradually gained *comparative* immunity from cholera *in proportion* as their two water companies have ceased to distribute sewage-tainted water among them, is a matter of familiar history.

“That cholera is still a terror to Europe shows how scantily such illustrations are yet understood. Even here in England the objects which I have named as essential are at best but rarely fulfilled ; indeed for vast numbers of our population scarcely rudimentary endeavours have been made to attain them. Town after town might be named, with myriad on myriad of population, where there is little more structural arrangement for the removal of refuse than if the inhabitants were but tented there for a night. The case of the water supply is no better : my reports are incessantly showing the too frequent foulness of private supplies ; while, as regards public water supplies, such as generally are in the hands of commercial companies, it has again and again been shown (and seldom more pointedly than in the present volume), that their conveniences and advantages are countervailed by dangers to life on a scale of gigantic magnitude, unless those who administer the supplies act under a very deep sense of responsibility.

“Cholera, ravaging here at long intervals, is not Nature’s only retribution for our neglect in such matters as are in question. Typhoid fever and much endemic diarrhœa are, as I have often reported, incessant witnesses to the same deleterious influence ; typhoid fever which annually kills some 15,000 to 20,000 of our population, and diarrhœa which kills many thousands besides. The mere quantity of this wasted life is something horrible to contemplate, and the mode in which the waste is caused is surely nothing less than shameful. It is to be hoped that, as the education of the country advances, this sort of thing will come to an end ; that so much preventible death will not always be accepted as a fate ; that for a population to be thus poisoned by its own excrement will some day be deemed ignominious and intolerable.”

Since the impurity of water seems a matter of such vital importance, it is necessarily of equal importance to be able to detect the impurities. Unfortunately this is no easy matter. For the detection of even the coarser impurities is a matter demanding much skill from the chemist and the microscopist ; and the most dangerous impurities of all, those, for example, which convey cholera and typhoid fever, are not to be detected by any known process of the chemist, nor by the highest powers of the microscope. When we see their deadly results we infer their presence, but all the light of modern science has not removed them from the category of pestilences *which walk in darkness*.

Wholesome water should be colourless, odourless, and tasteless ; but it is important to remember that a water may have all these qualities in a high degree and yet be a most dangerous compound. The water of the Broad Street pump, for instance, which reckoned its hundreds of victims in 1854, was so pleasant to the eye

and taste that people sent for it at great inconvenience to themselves ; and it cannot be too widely known that waters which are rich in nitrates and nitrites are often brilliant and sparkling. A water may be coloured and yet not be unwholesome, as waters tinged by the presence of iron or by peat soils bear witness. A water may be muddy from the suspension of mineral matter, but any want of clearness in a water must bring its purity under suspicion, and the cause of its muddiness should be carefully inquired into.

As a rough test for the purity of water we may mention the addition of a solution of *permanganate of potash*, better known as *Condy's fluid*. This fluid is of a beautiful purple colour, and when added to pure water, *i.e.*, water free from organic impurity, the purple colour remains, although of course it is diluted. When, however, the water contains much organic impurity the purple colour disappears, or is replaced by a brownish discolouration. *Clear water which takes the colour out of Condy's fluid is not safe to drink.*

We next turn to consider what means are at our disposal for *the purification of water* which has become fouled. The separation of the palpable impurities of water is comparatively a simple and easy matter. Mere *subsidence* will do a great deal, and if a muddy water be allowed to stand in a cask or bottle, much of the suspended matter, or perhaps all of it, will fall to the bottom, and the clear fluid can then be drawn off the sediment either by means of a syphon or by a tap placed near the bottom of the vessel. Solid impurities may to a great extent be removed by filtration. The simplest filter consists of a piece of cloth or calico, through which the water is strained, and in the interstices of which the impurities of the water are left entangled. A conical flannel bag will strain off a great proportion of the floating particles. The most perfect filter is the one which is used in the chemist's laboratory, and which may always be readily extemporised for domestic use. It is made thus, Take a square piece of *blotting-paper or thick cartridge-paper* and fold it twice down the centre, across and across. Put the folded paper into a funnel with the closed corner downwards. Then separate the upper free edges of the paper, and the most efficient filter known, for the separation of mechanical impurities, is complete, and it only remains to place the funnel in a suitable bottle and pour the impure water *very gently* upon the paper.

Layers of *sand and gravel* form very efficient filters, and the water companies employ this means of cleansing the water which they serve out to the public.

*Powdered charcoal* has long been a favourite material for the purposes of mechanical filtration. Charcoal has another property besides that of mechanically separating solid impurities. It is a powerful deodoriser, and to a great extent is capable of oxidising the organic matters which the water may contain. This it does by virtue of the oxygen which the charcoal holds within its pores. This function, however, is one which charcoal will not perform indefinitely, so that after a time it must be renewed, or, what is the same thing, it must be re-burnt. Animal charcoal, or charcoal made from burnt bones, is more powerful as an oxidiser and deodoriser than vegetable charcoal. An objection has been raised to animal charcoal because the phosphate of lime which it is liable to contain is dissolved by the water filtering through it, and encourages the growth of vegetable fungi in the water so filtered.



It is a very common expedient to filter water through alternate layers of various substances, such as gravel, charcoal, and sand.

*Spongy iron* has of late become a favourite material for purposes of filtration. It is said to possess much of the deodorising and oxidising power of charcoal, and is not open to the objections which we have named in connection with that body.

Filtration may obviously be performed upon any scale, and between the huge filtering beds of the water companies and the pocket charcoal syphon filters supplied to our troops in the tropics, we have a choice of filters of every size and description.

The so-called "*Poor Man's Filter*" is made by plugging the hole in the bottom of a common flower-pot with a piece of sponge, and then putting a layer of animal charcoal, another of clean sand, and a third of rather coarse gravel.

When small quantities of water for drinking are to be filtered, the best material for the filtering vessel is undoubtedly glass, so that its state of cleanliness and of repletion or emptiness may be at once evident. It should be put in a place where every member of the family may see it and have access to it. It is often a good plan to place a filter in the water cistern itself, so that all water drawn from the cistern for domestic use must be filtered.

One of the best filters which has yet been devised is that known as the "tank filter," and which we owe to the ingenuity of Major Crease, R.M.A. This filter is largely used on board ship, and is equally applicable for domestic use.

The action of a filter and pure water reservoir, inside an ordinary house cistern may be simply described. The impure water passes through the inlet into chamber of filter; thence upwards through a plate, usually of porous stone, then through powdered charcoal into the pure water reservoir, from which it may be drawn off cold by the pure water tap, or hot and pure from the boiler.

When the filter is in action the grosser impurities in the impure cistern water are stopped by the plate of porous stone, so that only the most minute impurities pass into the charcoal, and there they are finally stopped, and being chemically acted upon by the charcoal, their character is changed and they are deodorised. Every time, therefore, a servant opens the unfiltered tap to procure water for common washing-up purposes, the unfiltered water enters the inlet and scours out the whole of the impurities in the chamber, carrying them away out of the filter.

To clean the filter thoroughly once in every six months, or as often as may be deemed necessary, one of the household servants lifts a small galvanised chain (one end of which is fastened to the top of the cistern), thereby drawing out a plug from the upper part of the filter, and drops it into the inlet. She then turns on the unfiltered water tap for several minutes, thereby causing the cistern water to rush through the top opening violently downward through the filter and out of the tap, thoroughly driving out from the filter all impurities.

Although filters are of great and undoubted utility, and although we think that all water used for domestic purposes should be first filtered, we must yet caution the reader against placing too much faith in filtration as a means of purification. Dissolved matters of every kind pass through filters of all descriptions, and disease germs also do not seem to be stopped by any amount of filtration. The security afforded by filtration is limited, and not absolute.





It is a remarkable fact that the air varies very little in composition, and whether it be examined on the top of a high mountain or in a deep valley the relative proportion of the constituent gases remains, broadly speaking, the same. This is owing to the wonderful readiness with which gases mix or diffuse among each other. It was at one time thought that air in all situations had *absolutely* the same composition, but this has been proved not to be the case.

In addition to the gases mentioned, air always contains a large amount of watery vapour, and generally a small quantity of ammonia also. The atmosphere has a certain depth only, and is supposed to form a covering to the world about 120 miles in thickness. Upon us creatures who live at the bottom of it it presses with a weight which is calculated as equal to fifteen pounds upon every square inch of surface, a weight which is capable of balancing a column of mercury about thirty inches in height. If we climb out of the lower strata of the atmosphere into the higher, by going up a mountain or ascending in a balloon, the pressure of the atmosphere gets gradually less and less. Life can only be sustained in the lower strata of the atmosphere, and in the higher the rarefaction of the air, and the extreme cold, speedily produce difficulty of breathing and insensibility.

The greatest height ever attained by human beings was that reached by Mr. Glaisher and Mr. Coxwell in their famous balloon ascent made at Wolverhampton, on September 5th, 1862. The following facts with regard to it are culled from Mr. Glaisher's report:—

“The balloon left at 1h. 3m. p.m. The temperature of the air was 59°. . . At the height of one mile it was 41°, and shortly afterwards we entered a cloud 1,100 feet in thickness, in which the temperature fell to 36½°. . . . We reached two miles in height at 1h. 21m. The temperature had fallen to the freezing point. Three miles at 1.28 p.m., temperature 8°. Four miles at 1.39 p.m., temperature 8°. Five miles at 1.49. p.m., temperature 2°. Up to this time I had taken observations with comfort. I had experienced no difficulty in breathing, whilst Mr. Coxwell, in consequence of the necessary exertions he had to make, had breathed with difficulty for some time. At 1.51 p.m. the barometer stood at eleven inches, and shortly afterwards it stood at 9.75 inches, indicating a height of 29,000 feet. Shortly afterwards I laid my arm upon the table, possessed of its full vigour, and on being desirous of using it, I found it powerless—it must have lost its power momentarily. I tried to move the other arm, and found it powerless also. I then tried to shake myself, and succeeded in shaking my body. I seemed to have no limbs. I then looked at the barometer, and whilst doing so my head fell on my left shoulder. I struggled and shook my body again, but could not move my arms. I got my head upright, but for an instant only, when it fell on my right shoulder, and then I fell backwards, my back resting against the side of the car, and my head on its edge; in this position my eyes were directed towards Mr. Coxwell (who had clambered into the ring of the balloon). When I shook my body I seemed to have full power over the muscles of the back, and considerable power over those of the neck, but none over either my arms or my legs; in fact I seemed to have none. As in the case of my arms, all muscular power was lost in an instant from my back and neck. I dimly saw Mr. Coxwell in the ring, and endeavoured to speak, but could not; when in an instant

intense black darkness came ; the optic nerve finally lost power suddenly. I was still conscious, with as active a brain as at the present moment whilst writing this. I thought I had been seized with asphyxia, and that I should experience no more, as death would come unless we speedily descended ; other thoughts were actively entering my mind when I suddenly became unconscious, as on going to sleep. I cannot tell anything of the sense of hearing ; the perfect stillness and silence of the regions six miles from the earth (and by this time we were between six and seven miles high) is such that no sound reaches the ear."

Mr. Coxwell's hands were frost-bitten, and he too began to feel insensibility coming on, and had he not with marvellous presence of mind managed to open the valves of the balloon with his teeth, and thus caused it to descend, these two intrepid aeronauts must have perished. Mr. Glaisher estimates that he was insensible for seven minutes, and he was able to resume his work of taking observations at 2h. 7m., exactly thirteen minutes after the previous one, when his powerlessness began to come on. After his descent he felt no ill effects, and was able to walk between seven or eight miles. Mr. Coxwell describes Mr. Glaisher's countenance as "serene and placid during his insensibility."

Why is air so necessary for us ? To support the combustion that is always going on in our bodies. Just as a candle or a fire, if not furnished with a good supply of air, will "go out," so also is the vital spark extinguished by being deprived of its necessary oxygen. In the article on food we had occasion to compare the human body to a furnace, for which fuel was furnished in the shape of food, and in the combustion of this food in the body there is a great demand for oxygen, which is afforded by the air. The products of combustion, carbonic acid and watery vapour, must also be got rid of, and these two offices are performed by the function of respiration.

An adult man breathes about fourteen times in a minute, and in each act of respiration he draws into his lungs about thirty cubic inches of air, and expels a similar amount. It is estimated that about four hundred cubic feet of air are passed through the lungs in the twenty-four hours. "If a man," says Huxley, "be shut up in a close room, having the form of a cube, seven feet in the side, every particle of air in that room will have passed through his lungs in the twenty-four hours."

Seeing that the object of respiration is that the body may appropriate oxygen and discharge carbonic acid, it is obvious that the air in the room will have become altered in quality, that much oxygen will have been taken from it, and much carbonic acid added to it. The exact difference in composition of air before and after passing through the lungs is as follows :—

<i>Before.</i>					<i>After.</i>			
Oxygen	.	.	20·96		Oxygen	.	.	16·30
Nitrogen	.	.	79·00		Nitrogen	.	.	79·00
Carbonic acid	.	.	00·04		Carbonic acid	.	.	4·70
<hr/>					<hr/>			
100·00					100·00			

In round numbers it may be said that air by being respired once loses five per cent. of oxygen, and gains five per cent. of carbonic acid. The air which we expire



has always the same temperature as the body ( $100^{\circ}$  Fahrenheit), and is saturated with watery vapour. It is estimated that about half a pint of water is given off from the lungs in twenty-four hours. Besides carbonic acid and water, much organic matter is given off from the lungs, which is the cause of the close offensive smell of an over-crowded room.

When the amount of carbonic acid in the air used for breathing reaches the amount of 10 per cent., death results, and discomfort is felt when the amount of carbonic acid is infinitely below this.

Dr. Angus Smith, whose work, "Air and Rain," is a most valuable contribution to modern science, and whose experiments have been of a most exact nature, asserts that air containing more than .07 per cent. of carbonic acid is perceptibly "close" to our senses, and that air containing .1 per cent. is odious. Dr. Smith has done great service by clearly showing that very small variations of carbonic acid are distinctly perceptible, and that we can easily recognise the addition of three or four parts in 10,000 of air.

In populous districts the air is constantly being fouled by respiration, and by combustion of other kinds from furnaces, &c., and the amount of carbonic acid is found to vary according to the amount of fouling causes which are present. Angus Smith has estimated the amount of carbonic acid per cent. in various samples of air, and the following are some of his results:—

On the hills of Scotland . . . . .	.0332
In the London parks . . . . .	.0301
In the London streets (average) . . . . .	.0341
In the "New Cut" (Lambeth) . . . . .	.0413
In Lower Thames Street . . . . .	.0428
In Oxford Street, W. . . . .	.0344
Theatre (1) gallery, 10 p.m. . . . .	.1010
Theatre (2) boxes, 12 p.m. . . . .	.2180
Theatre (3) pit, 11 p.m. . . . .	.3200
Court of Chancery (3 feet from ground) . . . . .	.2030
Over "middens" in Manchester . . . . .	.0774
In study . . . . .	.1177
In mines (largest amount) . . . . .	2.5000
Metropolitan Railway . . . . .	.1452

The amount of oxygen in the air, taken from different situations, is found to vary very much also, as the following results of Dr. Smith's analysis show:—

AVERAGE AMOUNT OF OXYGEN PER CENT.	
Average . . . . .	20.9600
North-east sea-shore and open heath . . . . .	20.9990
Open places in London (summer) . . . . .	20.9500
In small room with petroleum lamp . . . . .	20.8400
Pit of a theatre (11.30 p.m.) . . . . .	20.7400
Court of Queen's Bench (Feb. 2, 1866) . . . . .	20.6500
When candles go out . . . . .	18.5000
Very difficult to remain in for many minutes . . . . .	17.2000

Now, we have seen that the average amount of carbonic acid in the air is .04 per cent., and that when the amount reaches .07 per cent. the air is "close" and disagreeable. Further, we have seen that air which has been once used for respiration contains 4.7 per cent. In order, therefore, that the carbonic acid in the expired air shall be diluted until the normal percentage of .04 is approached, it is obvious that we require more than 100 volumes of fresh air. Dr. Parkes thinks that 125 times the volume of the expired air ought to be allowed, and if this figure be granted, then man's daily want of fresh air amounts to 50,000 cubic feet, or something more than 2,000 feet per hour. If each man is to be supplied with this large amount of air, it is obvious that too many men must not be placed in one room, or else the forcing in of the necessary air will necessitate unbearable currents. It is found that for each man to get his proper supply of fresh air, a space must be allotted to each of not less than 800 cubic feet.

Thus, suppose we have to construct a dormitory in a barrack for the accommodation of 50 soldiers, we must allow a cubic space of  $800 \times 50 = 40,000$  cubic feet; and if the calculated amount of 2,000 cubic feet of fresh air is to be allowed to each man per hour, arrangements must be made for the hourly admission of 100,000 cubic feet of air.

Our barrack room, then, should be 125 feet long, 40 feet broad, and at least 8 feet high. There should be inlets for fresh air, amounting collectively to an area of 20 square feet, outlets of the same size, and a current of air must move from one to the other at a uniform rate of 18 inches per second. This allowance of 2,000 cubic feet per hour is considered by many to be excessive, and the Barrack Commissioners usually only allow 1,200 cubic feet. Under many circumstances 2,000 cubic feet is not enough, and when the air is likely to be contaminated by organic effluvia, as is often the case in hospitals, as much as 6,000 feet is allowed.

It must not be forgotten that in a room man is usually not the only thing which makes demands upon the fresh air. Fires, and lights, and very often domestic animals have to be considered. It is estimated that an ordinary gas-burner burns 3 cubic feet of gas per hour, and for the combustion of this gas, 5,400 feet of air are necessary, so that for every gas-burner the number 5,400 has to be added to the hourly admission of fresh air.

As regards the cubic allowance for each man, it must be borne in mind that 800 cubic feet is to be regarded as a minimum. In hospitals twice this amount is allowed. In building workshops it is always good economy to provide ample space, and thorough ventilation, for it is found that the amount of work is, *ceteris paribus*, directly in proportion to the amount of fresh air allowed.

When air is fouled by respiration and by human exhalation, there is much organic matter given off not only from the lungs, but probably from the skin as well, which gives the peculiarly offensive odour to a crowded room. Nothing is more sickening than the odour given off by a crowd of the "great unwashed." Shakespeare has aptly described this feature of a crowd in *Julius Cæsar*. "The rabblement hooted, and clapped their hands, and threw up their sweaty nightcaps, and uttered such a deal of stinking breath, because Cæsar refused the crown, that it had almost choked Cæsar, for he swooned and fell down at it; and for



mine own part, I durst not laugh for fear of opening my lips and receiving the bad air."

This organic effluvium deserves almost as much consideration as the carbonic acid, for it is certainly most unhealthy, and is very difficult to get rid of. The "organic smell" will hang about a room for a long time, and persists often for hours, in spite of open windows and thorough draughts. The breath of man is often, we know, laden with contagious particles, and it is only reasonable to suppose that these contagions lurk in the organic elements which, when they reach a certain degree of concentration, we detect readily enough with the nose, but which elude detection by the most subtle tests of the chemist.

We dwell upon these organic effluvia because they probably constitute the difference between air poisoned by the respiration of animals, and air which is merely deficient in oxygen or too rich in carbonic acid. We have seen that although Mr. Glaisher was rendered insensible and nearly killed during the balloon ascent, his recovery was immediate and complete directly the asphyxiating conditions were removed; and it is a matter of every-day experience that those who inhale "laughing-gas" for the production of insensibility recover rapidly and completely.

It is a matter also of every-day experience that to stop in a crowded room—a ball-room, a theatre, or a church—entails headache, poorliness, loss of appetite, and a general feverishness, which in some persons will persist for twenty-four hours or more. To habitually spend one's time in an atmosphere of this kind certainly entails a permanent and serious impairment of the health.

The most notable instance on record of human beings being exposed to the poisonous influence of an atmosphere fouled by respiration is afforded in the history of the imprisonment of 146 of our countrymen in the Black Hole of Calcutta, on June 20th, 1756. One of the survivors, Mr. Holwell, a surgeon in the employ of the East India Company, has given a most graphic account of this terrible episode of war, and the following facts with regard to it are taken from his well-known letter, written "*From on board the Syren sloop, the 28th of September, 1757,*" and addressed to W. Davis, Esq. When the doors of the "Black Hole" were opened and the prisoners driven in, Holwell was among the first to enter. He says, "I got possession of the window nearest the door, and took Messrs. *Coles* and *Scott* into the window with me, they being both wounded (the first, I believe, mortally). . . . Figure to yourself, my friend, if possible, the situation of 146 wretches, exhausted by continual fatigue and action, thus crammed together into a cube of about eighteen feet, in a close sultry night in Bengal, shut up to the eastward and southward (the only quarter from whence air could reach us) by dead walls, and by a wall and door on the north, open only to the westward by two windows, strongly barred with iron, from which we could receive scarce the very least circulation of fresh air. . . . Various expedients were thought of to give more room and air. To obtain the former it moved some to put off their clothes. This was approved as a happy notion, and in a few minutes I believe every man was stripped (myself, Mr. Court, and the two wounded young gentlemen by me, excepted); every hat was put in motion to produce a circulation of air, and Mr. Baillic proposed that every man should sit down on his hams. This expedient was several times put in practice,

and at each time many of the poor creatures, whose natural strength was less than others, or had been more exhausted, and could not immediately recover their legs as others did, when the word was given to RISE, fell to rise no more ; for they were instantly trod to death or suffocated. When the whole body sat down they were obliged to use many efforts before they could put themselves in motion to get up again."

They were immured at 8 p.m., and before 9 everybody's thirst became intolerable. The cry was for water, which was brought by the guards, and handed in through the bars in hatfuls, the guards deriving much enjoyment from watching the poor wretches fighting for the water, which thus, by rousing their passions and excitability, proved a curse instead of a blessing.

"From about nine to near eleven, I sustained this cruel scene and painful situation, still supplying them with water, though my legs were almost broken with the weight against them. By this time I myself was very nearly pressed to death, and my two companions, with Mr. William Parker—who had forced himself into the window—were really so. . . . I came into the prison without coat or waist-coat ; the season was too hot to bear the former, and the latter tempted the avarice of one of the guards, who robbed me of it when we were under the verandah. . . . I was observed by one of my miserable companions on the right of me, in the expedient of allaying my thirst by sucking my shirt-sleeves ; he took the hint, and robbed me from time to time of a considerable part of my store, though after I detected him I had ever the address to begin on that sleeve first, when I thought my reservoirs were sufficiently replenished, and our mouths and noses often met in the contest. This plunderer, I found afterwards, was a worthy young gentleman in the service, Mr. Lushington, one of the few who escaped from death, and has since paid me the compliment of assuring me he believed he owed his life to the many comfortable draughts he had from my sleeves. I mention this incident, as I think nothing can give you a more lively idea of the melancholy state of distress we were reduced to. Before I hit upon this happy expedient, I had, in an ungovernable fit of thirst, attempted drinking my urine, but it was so intensely bitter there was no enduring a second taste, whereas no Bristol water could be more soft or pleasant than what arose from perspiration. By half an hour past eleven, the greater part of those living were in an outrageous delirium, and the others quite ungovernable, few retaining any calmness but the ranks next the windows. . . . Others who had yet some strength and vigour left made a last effort for the windows, and several succeeded by leaping and scrambling over the backs and heads of those in the first ranks, and got hold of the bars, from which there was no removing them. Many to the right and left sank with the violent pressure, and were soon suffocated, for now a steam arose from the living and the dead which affected us in all its circumstances, as if we were forcibly held with our heads over a bowl of strong volatile spirit of hartshorn until suffocated ; nor could the effluvia of the one be distinguished from the other, and frequently when I was forced by the load upon my head and shoulders to hold my face down, I was obliged, near as I was to the window, instantly to raise it again to escape suffocation."

Holwell suffered acutely from others, in their efforts to get to the window



clambering on his shoulders and there remaining. At last his strength gave way, and he left the window in the resolve to die in comparative peace.

"I was at this time sensible of no pain and little uneasiness. I can give you no better idea of my situation than by repeating my simile of the bowl of spirit of hartshorn. I found a stupor coming on apace, and laid myself down by that gallant old man, the Rev. Mr. Jervas Bellamy, who lay dead with his son, the lieutenant, hand in hand, near the southernmost wall of the prison."

Shortly afterwards the narrator became himself insensible. At last, at six in the morning, an order came for the release of those who remained still alive. "The little strength remaining among the most robust who survived made it a difficult task to remove the dead piled up against the door, so that I believe it was more than twenty minutes before we obtained a passage out for one at a time."

There were 123 dead, and 23 alone survived. These 23 survivors all suffered from an attack of fever after their liberation, which was accompanied by a copious eruption of boils all over the body. Holwell describes himself as suffering from "high putrid fever," and as too weak to stand. He also suffered from an outbreak of boils from head to foot, and on July 7th he was seized with a violent attack of "gout" in one foot.

This febrile condition was probably the result of exposure to the organic effluvia.

Happily cases of acute poisoning from foul air, at least on such a scale as that just described, are infinitely rare, but cases of slow poisoning from the same cause are, we fear, by far too common, both in the ill-constructed and unventilated dwellings of the poor, and in over-crowded workshops, workhouses, school-rooms, ball-rooms, churches, and theatres.

There are few things more astonishing than the poisonous misery to which the world of fashion submits, night after night, during the London season. A fashionable entertainment—a regular "London crush"—almost recalls the piteous story told by Mr. Holwell. Five or six hundred people jammed into a room calculated to contain perhaps a tenth part of them, and probably as many wax-lights as there are guests using up the oxygen, and adding their quota of carbonic acid to the already over-charged atmosphere. Is it surprising that windows stream with water, and the guests drip with perspiration, and in the very height of this misery fly for relief to those poisonous compounds called champagne? Is it to be wondered at, also, that scented soaps and perfumes scarcely suffice to mask the odour of organic effluvia; or that those who habitually participate in these delusive joys are among the most regular of the doctor's patients? Why it is that we so persistently turn night into day, and prefer to take our pleasure, not only in crowds, but after dark, when the air of our rooms is fouled by the combustion of gas and candles, is certainly a most inscrutable thing. "Early to bed and early to rise, make a man healthy and wealthy and wise." The reason for this is not far to seek, since he who so acts up to this dogma, by seizing on the hours when artificial light is not necessary, avoids the breathing of the carbonic acid which is given off during the combustion of the midnight oil. The needless expenditure of coals and candles which our senseless fashions entail must be enormous; and it would be an interesting inquiry for the statistician to

ascertain what would be saved in the course of a London season if it were to become fashionable to rise at five, and breathe the pure morning air, instead of, as is too often the case, retiring to rest at that hour.

Besides *respiration* and *combustion*, air is fouled in other ways, and among these we may mention the various gases given off during *decomposition*, such as ammonia and sulphuretted hydrogen. These are the gases which, under the form of "sewer gases," escape into our houses, and which are given off from dung-heaps, cesspools, and other similar sources. It is probable that they give rise to headache and diarrhœa, if not to more serious forms of ill-health. In certain districts—particularly marshy districts and in hot countries—a something called malaria is given off into the air which causes ague and intermittent fever in those who breathe it. This malaria is supposed to be a gas, but its exact nature is not known.

A most important impurity in the air is *dust*. Dust is a very complex body, and is composed of things animate and inanimate—animal, vegetable, and mineral. Everything that is capable of being wafted by the wind becomes dust. Fine particles of sand, granite, flint, and chalk, ground up with horse-dung, constitute the dust of our streets. The dust in hospital wards has been found, when examined by the microscope, to contain, among other things, fine scales from the surface of the skin, and some samples are so rich in organic matter that when burnt they emit a smell like burnt horn.

Particles of "dust" are probably carried immense distances by the wind, and ships at sea have had their decks covered with the dust of lava emitted by a volcano two hundred miles off.

Very many microscopic animals and plants have been detected in the dust of the air, and it is supposed that the germs of disease may sometimes be carried in the same way. It is certain that the pollen of plants (the fine dust which covers the anthers of flowers) may be carried great distances, as was proved by Dr. Blackley of Manchester, who made some interesting experiments at Filey, on the east coast. He flew a kite with the wind blowing from the sea. On to the tail of his kite he fixed slips of glass, moistened with glycerine, so that these slips, to which any floating particles would adhere, were exposed, at a considerable height, to an east wind. On examining these slips of glass they were found to be studded with grains of pollen, which must have been wafted at least as far as from the opposite coast of Holland, since that was the nearest point where pollen could have been generated. These floating particles of pollen have been supposed to cause the troublesome disease known as hay fever.

The dust of certain industries is very fatal to those who follow them. Thus the knife-grinders of Sheffield have been found to suffer from a peculiar form of consumption, brought on by inhaling the fine particles of steel floating in the air. Potters also suffer from inhaling the dust which is inseparable from their trade, and many more similar examples might be quoted, as bakers, millers, cement makers, miners, &c. The very purest air is found to contain solid particles, which may be strained off by drawing the air through layers of cotton-wool. The air of London is always laden with "blacks," i.e. flakes of soot, which arise from faulty combustion of coal, but ordinarily they cause no more inconvenience, apparently, than arises



from the fact of their blackening anything upon which they may alight. People with lung disease find it difficult to remain in London, and this is probably owing to the irritation caused by the blacks and sulphurous acid, which are very prevalent in the London air.

When a sudden fall in temperature coincides with an absence of wind and a moist condition of the air, we get fogs, and the "blacks" not being blown away, these "London fogs" are particularly dense, opaque, and irritating.

One of the worst fogs on record was on the 9th and 10th of December, 1873, and the mortality it caused among human beings and animals was something very remarkable, and ought to serve to remind our Municipal Councils that the question of "smoke drainage" is one of great importance to the public health, and one which ought to engage their attention. The three following extracts will show what were the effects of this fog:—

From the Registrar-General's return for the week ending December 20th, 1873:—"In London, 2,404 births and 2,415 deaths were registered. After making due allowance for increase of population, the births exceeded by 108, and the deaths by 780, the average number in the corresponding week of the last ten years. The deaths exceeded the number returned in any week since the cholera epidemic in the autumn of 1866. . . . The annual death rate was 38 per 1,000. The rate was 34 per 1,000 in the west, 38 in the north, 43 in the central, 42 in the east, and 35 in the south groups of districts.

"The deaths from diseases of the respiratory organs exceeded the average by 551. In ten cases death was certified as due to the fog."

From the *Times* of December 11th, 1873:—"Smithfield Club Cattle Show.—Up to last night seventy-eight of the cattle, and, we believe, one of the sheep, had been sent out of the hall, not from any outbreak of contagious or other disease, but, as Mr. Brandreth Gibbs explains in a communication addressed to us, solely from the effects of the fog. It does not appear that the arrangements for securing a good ventilation in the hall have ever been called in question; but what has been wanted during the last two days was clear air, not a mixture of atmospheric air with carbonic acid and sulphur, and the same causes which produced the fog interfered also with the ascending current necessary for maintaining a continual change in the air enclosed in the hall. Professor Brown, the veterinary inspector, aided by Professor Simonds, of the Royal Veterinary College, examined all the animals which were suffering from difficulty of breathing, and it is hoped that by the wise expedient of sending the cattle, a few at a time, for an airing outside the hall, the threatened sickness, and probable death, of a great number of animals will be averted."

From the *Times*, December 12th, 1873:—"Smithfield Club Show.—Up to yesterday evening there had been removed from the show ninety-one, or thirty-six per cent. of the total number. Some of the animals have been saved by being carried quickly into the clearer air of the country, but a very considerable number have been slaughtered, while several died before it was discovered they were being poisoned by the smoke-laden atmosphere."

From what we have said about the impurities of the air, and the evils that they

cause, it will be evident that we should spare no efforts to ensure for ourselves a plentiful supply of the purest air that can be obtained.

This is best got by living as much as possible in the open air; and in the summer months it is a good plan to make use of any verandah or balcony with which a house may be supplied, and to take meals and work in it, in preference to the rooms, which must be closer and less bountifully supplied with air. The very best rooms, no matter how carefully they may be ventilated, come very far short of the open air itself.

In this country it is nearly always possible to have an open window all the year round, especially in rooms which have windows on two sides, since there need be no draught from an open window in a wall away from the wind. A window open at the top—no matter to how small an extent—has a wonderful effect in keeping a room fresh, and no one who has become accustomed to the luxury of a constantly open window can tolerate the stuffiness of a close room.

It is of an evening when the lamps are lighted, the windows and shutters closed, and the family draw round a blazing fire, that the greatest errors in the matter of ventilation are committed. The fire, of course, has a powerful aspirating effect. Its need for air is great, and as a consequence a powerful draught is drawn through every chink—under the door, chilling the feet of those whose cheeks are glowing in the blaze; through the keyhole, which serves as a sort of Æolian harp as the wind rushes through it; and through every cranny in the windows which has been left by bad carpentering and failing putty. It is a well-known fact that in a badly-constructed room, where no provision has been made for ventilation, the discomforts of draught increase in proportion to the size of the fire.

At an ordinary English “dinner party,” when eighteen people are crammed into a space not big enough for six, when the lights are increased perhaps four-fold, and the servants in a like proportion, the resulting headache is due quite as much to the foulness of the air as to any indiscretion in eating or drinking.

It is a comparatively easy matter, however, to keep a room at least tolerably ventilated without a draught. One of the chief things to aim at is, that the delivery of the air shall be as *vertical* as possible—that is, that the air shall be directed towards the ceiling of the room. This is done by providing what is known as a “*louvre-opening*”—*i.e.*, an opening communicating with the external air, but protected internally by a slanting board which directs the in-coming air in an oblique upward direction.

In some “French” windows this is well provided for. The bottom of the window opens like a folding-door while the two top panes are made to open inwards from a hinge fixed at their lower border, and thus the *louvre-opening* is provided in the window itself.

A very good system of vertical delivery is that lately insisted on by Mr. Tobin, and which is known as “Tobin’s method.” It consists in providing a tube running through the wall. The vertical part of the tube is about five feet high, so that the upper opening is well above the heads of people sitting in the room. As the temperature of the air in the room increases, the air from outside rushes in, and being delivered vertically, it travels in a compact column towards the ceiling, against



which it impinges, and being "scattered" as it were by the force of impact, it diffuses itself gradually throughout the air in the room. Both ends of the tube should be protected by gratings, so that no putrescible matter can be placed in it either by design or accident. The tube should also be swept at intervals and thoroughly cleansed.

A very good method for providing a vertical delivery of air into a room, provided the room be fitted with sliding sash windows, is to place a piece of wood in the lower part of the window-sill, which shall completely fill it up and prevent the lower sash from descending to its full extent. In this way an open chink is left between the upper and lower sashes at the point where they are usually locked together, and through this chink, which is nearly an inch in width, a stream of air flows compactly towards the ceiling, and is there scattered.

If air is allowed to flow into a room it must also be allowed to flow out of it, and it is as necessary to provide *outlets* for the air as it is to provide *inlets*. It is, we believe, Mr. Tobin's idea that if provided *inlets* are made in a room, the air may be left to find its own way out. This opinion, however, is not held by the majority of the authorities on ventilation. A capital outlet for air is usually the chimney, and a room provided with vertical inlets and a fireplace is sure to have a constant stream of air flowing from one to the other. If there be a fire in the grate the current of air is, of course, at a maximum, but with or without a fire the current is sure to exist.

*The "register" of a stove should never be closed.* It is a bad plan to have a register at all. If the register be closed, the chief outlet for air is closed, and a proper ventilation of the room is impossible. Whenever a room which has been used smells fusty and close always look to the "register," and if necessary open it.

#### EXERCISE.

Sound health without a due exercise of all the bodily functions is impossible. All our organs were made to be used. Some of them are beyond our control, and continue to do their appointed work in spite of ourselves. The heart and lungs cease to work only with the cessation of life, and those who imitate, as it were, these involuntary organs, and continue to the last to transact the business of life, be it mental or be it physical, provided they do not fall into the error of over-taxing their bodies, generally enjoy, not only the longest, but the healthiest of lives also. Although in general parlance we limit the term "exercise" to the exercise of the muscles, it must, nevertheless, be borne in mind that this restricted use of the word is not accurately scientific. Every part of the body needs its due amount of exercise and repose, and if either the one or the other be denied it, impairment of constitution must result. If mind, muscle, or stomach has work put upon it beyond its powers, a failure of those powers, more or less permanent, will result, and a similar impairment will infallibly result if we are not careful to allow each its proper exercise and function.

Physical exercise, the exercise that is of the muscles, stands apart from other forms of exercise in this, that it entails the exercise of other organs and functions as

well, and it may almost be said that physical exercise entails the exercise of all the internal organs, exclusive perhaps of the brain; and although there is certainly no antagonism between a proper mental and physical development, still the two bear no necessary relation to each other, and athletes have not often been remarkable for their intellectual acquirements.

The effects of muscular exercise are, for the most part, perfectly obvious to the most superficial observer. The beats of the pulse increase in number and in force, which means that the heart is working harder than when at rest; the breathing sets quicker and deeper, which shows that chemical change has increased in amount, causing an increased demand for fresh air and its contained oxygen; the surface of the skin gets red, manifesting an increased fulness of the fine blood-vessels contained in it; and the proper functions of the skin, as evidenced by copious perspiration, are very largely increased. Another great evidence of the increased chemical change going on in the body is the increase of warmth, and the agreeable sensation of heat, even in the extremities. The actual temperature of the body, as measured by a thermometer, is not increased during exercise—a fact which is owing to the cooling influence of the constant evaporation of perspiration which is taking place at the surface. If it were not for this wonderful provision of nature, by which a cooling influence is provided to counteract the necessary production of heat involved in exercise, exercise would become impossible. The evaporation from the skin causes a demand for water in the body, and hence thirst is one of the most immediate results of exercise. In a healthy person hunger is almost as marked as thirst, but it is to be remarked that hunger is not observable if the body have been over-taxed, and even in healthy persons it is very often not acutely felt until after the body has been allowed an interval of repose. The final result of exercise is fatigue. Fatigue in the muscles is evidenced by loss of power, some pain and “stiffness,” and the general fatigue of the body by an irresistible inclination to sleep.

The increase in the respiratory function during exercise is capable of accurate measurement, and, thanks to the untiring experiments of Dr. Edward Smith, we are able to lay before the reader very exact figures, which may be taken to show the rate of chemical change which exercise of various kinds demands. Dr. Smith measured the amount of air drawn into the lungs during measured intervals, and, taking the amount required by the body during absolute repose as his unit, he compiled the following table :—

Lying position . . .	1·	Walking and carrying 62 lb.	3·84
Sitting „ . . .	1·18	„ „ 118 lb.	4·75
Standing „ . . .	1·33	„ 4 miles per hour .	5·00
Singing „ . . .	1·26	„ 6 „ .	7·00
Walking 1 mile per hour .	1·9	Riding and trotting . .	4·05
„ 2 „ „ .	2·76	Swimming . . .	4·33
„ 3 „ „ .	3·22	Treadmill . . .	5·50
„ and carrying 34 lb.	3·5		

This greatly increased demand for oxygen in the body during exercise is necessitated by the change of tissue and rapid oxidation going on in the muscles, and one lesson which should be learnt from these figures is this, that hard labour is best



carried on in the open air, and that if the apartments in which work is done be not properly ventilated and thoroughly supplied with fresh air, it is impossible for the labourer to put forth his maximum amount of energy, and thus the master is deprived of the full working-power of his workmen.

The exercise of a muscle, if it be not excessive, causes an improved condition of the muscle—increase of firmness, bulk, and power. This is a well-known and very obvious fact, the leg of the dancer and the arm of the blacksmith being the well-recognised examples of this truth. For the production of this improved state of nutrition, however, it is important that the muscle be not *over-worked*, for if this be done, wasting and impairment of nutrition will assuredly result. Every period of muscular action or contraction must alternate with a period of relaxation, and it is supposed that it is during this latter period that the nourishment of the muscle is provided for. There must be a due relation between tension and repose, or impairment of nutrition results. If the period of tension be in excess, the same result is brought about as when the excess is on the side of repose. It is a common observation that we can do much more work if our muscular action alternate with muscular relaxation. Thus the blacksmith will continue to wield his hammer for an hour or more, and stroke follows stroke with equal force, and without intermission. If, however, the blacksmith were to attempt to hold his hammer at arm's length continuously, without allowing for the necessary intervals of muscular repose, he would find that intense muscular fatigue would result in a very few minutes, and from this fatigue he would be some hours in recovering.

Now, the heart is an organ which is always at work, and which is, at first sight, an apparent exception to the rule necessitating the alternation of intervals of repose with intervals of work. This, however, has been shown not to be the case, for between every beat or impulse of the heart—*i.e.*, every heart's throb—there is an interval of absolute rest, during which the waste caused by action is repaired. This interval of rest has been estimated at about one-third of the time occupied by the heart in one revolution—that is, from the commencement of one contraction to the commencement of the next. In this interval or ‘pause,’ as it is technically called, the heart is asleep, as it were, and it is a curious fact to notice the relation between the sleeping and waking moments of the heart, and the sleeping and waking moments of the entire man, for if all the time occupied by the heart in its pauses in the twenty-four hours be added together, they amount to something like eight hours, which is the time devoted to sleep by the average of the human race.

This necessity for intervals of relaxation, perhaps, serves to explain why it is that man is made bilaterally symmetrical, or double, for by using first one side and then the other he is enabled to continue his work for longer periods than otherwise would be the case, for while the muscles on one side of the body are contracting, those on the other side are getting their necessary repose. To many people, perhaps to all people, it is not so fatiguing to walk as it is to stand erect in one position. The reason would seem to be that in walking we use each side of our body alternately, while in standing we use both sides simultaneously, and the muscles which keep the body erect being subjected to a prolonged strain, the sense of fatigue very quickly supervenes.

The health of every individual part of the whole body being necessary for the perfect health of the whole body, and exercise being undoubtedly necessary for the healthy well-being of our muscles, it follows that we should be careful to exercise *all* the muscles of the body. Many a man whose occupation is sedentary keeps himself well by walking to and from his office or place of business, and it is obvious that this amount of exercise does keep a man fairly healthy. It is equally obvious, however, that our sedentary classes are noted for narrow chests and shoulders, and it is only reasonable to suppose that if they were as careful to exercise their upper limbs as they generally are to exercise their lower, this defect of figure would soon disappear. The great merit of our "national game" of cricket lies in the fact that it leaves no part of the body unexercised. Arms and legs are equally used, and, in batting and fielding alike, every muscle of the trunk is frequently brought into play. Quickness of vision and of thought, judgment, boldness, brute-strength, and delicacy of muscular effort, each receive their share of training, and the best cricketer is presumably the man who has these qualities meeting in due proportions in his own person.

The great Duke of Wellington is said to have stated that the battle of Waterloo was won in the cricket fields of England; and it is certain that we are extremely fortunate in having a national pastime which, while it requires a vigorous exercise of muscle, is by no means deficient in the calls which it makes on the mental activity of its votaries.

Swimming is one of the best of exercises, because it involves an equal use of the arms and legs, and since it is practised in a state of nakedness the limbs have a freedom of motion which they seldom attain in other exercises. The fashion, which has become pretty general of late, of teaching ladies to swim, is one that should be encouraged in every way, and, indeed, we hope it may long be the characteristic of the English young lady that she is fond of athletic exercises. The introduction of "croquet" some years since, a game which encouraged our wives and daughters to spend their days in the fresh air and gentle exercise, was a decided gain to the British nation, and its substitution in later times by "lawn tennis," a game which necessitates not only more active movement, but calls upon the upper as well as the lower limbs, and entails much of the mental quickness of cricket, was a still greater gain.

For the well-being of our race, it is an absolute necessity that our women should be strong and active, and physically perfect as well as the men. Unless this be the case, a physically perfect progeny is an obvious impossibility. It is an encouraging fact also to note the heredity of athleticism as well as other qualities, and the instances of a genius for cricket "running in families," and descending from one generation to another, are too common to need particularising. Among games necessitating the use of all four limbs we must mention "fives," "tennis," "football," "bowls," and "skittles," and with regard to the latter, we trust that no stupid notions of "vulgarity" will allow a really fine, and undoubtedly useful, old English pastime to die out. Bicycling has the defect that it leaves the upper limbs comparatively unexercised. "Dancing" is a pastime which by all means should be encouraged, as in it we move our limbs in obedience to a sense which otherwise is



not brought into relation with exercise. The pleasure of the rhythmic movement of the dance is one which most of us appreciate, and the fact that the muscular movement of dancing must be *orderly* and *rhythmical* serves to educate the muscles, to a certain extent, in precision of movement. Good dancers are seldom *clumsy*, which means that they have a good control over their voluntary movement. It is a well-known fact, that in the Middle Ages music was employed to cure not only disorders of the mind, but also disorders of movement. The disorderly movements which followed the bite of the tarantula were only cured by measured movements performed to the strains of a particular melody. It is also worthy of note, that an appreciation of rhythm is one of the last of the intellectual powers to disappear. In idiot asylums there are very few who cannot appreciate the cadences of a simple tune, and it is tolerably certain that many of the lower animals—horses for example—move with greater gaiety and elasticity to music. The motive power for soldiers on the march which is got from a military band is recognised by all military authorities; and it was one of the most remarkable points in the performance of the American pedestrian, Weston, that he was accustomed to make use, as it were, of music to help him on his way when he had become jaded by prolonged exertion. This power of music is as wonderful as it is undoubted, and the only explanation which the writer would offer is this, that a well-timed tune enables us more readily to regulate the periods of muscular contraction and muscular relaxation.

With regard to the exercise of dancing, however, the writer would utter a word of caution. It is much to be regretted that dancing in this country is almost invariably carried on in rooms in which the atmosphere is stifling, and the benefit derived from the exercise is more than counterbalanced by the evil resulting from foul air. Those who spend night after night in hot ball-rooms are guilty of an almost suicidal act; and those who spend six and eight hours at a stretch in this atmosphere are guilty of a gross intemperance, which surely will do them harm. While, therefore, the author recommends dancing as an exercise, he would lay stress on the advice that this exercise should be in moderation and in a pure air. As for the fashionable "ball" or London "dancing party," as at present conducted, he can only regard it as an unmitigated nuisance, and an evidence of foolish ignorance.

The Germans are more methodic than we are in the physical training which they give their youths; and gymnasia, in which young men are put through a regular course of physical training, are tolerably common. These gymnasia are undoubtedly useful institutions, and have an important influence on the physical condition of the race. Every man in Germany is compelled also to go through three years of military service, and during that time (from eighteen to twenty-one) his physical development is very thoroughly attended to; and there can be no doubt that the German military system must have a most beneficial influence upon the physical development of the male population. Whether this good is more than counterbalanced by certain evils inseparable from the military system it is not for us to consider in this place. We trust, however, that gymnasia will become more common in this country than at present is the case; and we hope before long to see no school or college without some provision for giving a methodic training to the

body as well as the mind. It seems to be of the utmost importance, also, that girls should be incited towards exercise as well as boys. In the upper and middle strata of society the girls certainly get, if they choose, a fair share of physical amusement, but in the lower strata we doubt if this all-important matter is sufficiently attended to. The two most beautiful ladies of the writer's acquaintance, who have each of them a family of well-formed, beautiful, and healthy children, were both of them remarkable in their girlhood for their athleticism, and although by the exercise they gave their bodies they have been enabled to transmit like qualities to their children, they have not a less share of womanly grace and of feminine accomplishments than falls to the lot of the average of womankind.

A very important question with regard to exercise is the *amount* which should be taken, and to this question we cannot expect to get a perfectly accurate reply. The body is always at work, and both during sleeping and waking certain of its muscles are never quiet. These are the muscles which are employed in respiration—the heart, whose muscular pump never ceases to contract; and the muscular walls of the bowels, which, although not always at work, are very often so, even when the body generally is enjoying absolute repose. This exercise, which is beyond our own control, and which goes on in spite of us, has been called the *internal work of the body*, while the voluntary work has been called the *external work*.

It has been found impossible to discuss the question of the amount of exercise without having some standard expression for the amount of work done. The *unit* of work employed in this country is the *foot-ton*, or the labour required to raise one ton weight one foot in height. In France and on the Continent generally the unit is the *kilogramme-metre*, or the labour required to lift a kilogramme (about 2 lbs.) to the height of a *metre* (about thirty-nine inches). Most of our exact knowledge on this point is due to Professor Haughton, of Dublin, who, being equally distinguished as a mathematician and a physiologist, has been able to reduce this subject to something like exactitude. According to this authority the work done by the heart alone is equivalent to 122 foot-tons in the twenty-four hours, while the work done during respiration is equal to eleven foot-tons more. Other authorities place the internal work higher, and Dr. Parkes is inclined to regard the whole internal work of the body as equivalent to 260 foot-tons. The following estimates have been made by Haughton of the actual work involved in a day's labour (eight hours) of various kinds:—

Pile-driving . . . . .	312	foot-tons.
Porter carrying goods and returning unladen . . . . .	325	„
Turning a winch . . . . .	374	„
Pedlars always loaded . . . . .	303	„
Paviours at work . . . . .	352	„
Shot drill (three hours). . . . .	160·7	„
Walking one mile on the level, the weight of the man being 150 lbs. . . . .	17·67	„
Walking ten miles . . . . .	176·7	„
Walking one mile and carrying 60 lbs. . . . .	24·75	„
Walking ten miles „ „ . . . . .	247·5	„

Using these standards and practically comparing the work of one man with the work of another, and observing not only what was stated to be hard, but also what



appeared to be so to the observer, the conclusion has been arrived at that an average day's work is 300 foot-tons; that 400 foot-tons is a fairly hard day's work, and 500 foot-tons excessively hard (Parkes).

Parkes further says, "Looking at all these results, and considering that the most healthy life is that of a man engaged in manual labour in the free air, and that the daily work will probably average from 250 to 350 tons lifted one foot, we can perhaps say as an approximation that every healthy man ought, if possible, to take a daily amount of exercise in some way which shall not be less than 150 tons lifted one foot. This amount is equivalent to a walk of about nine miles; but then, as there is much exertion taken in the ordinary business of life, this amount may be, in many cases, reduced. It is not possible to lay down rules to meet all cases, but probably every man with the above facts before him could fix the amount necessary for himself with tolerable accuracy."

Not only has the *amount* of work to be considered, but the *rate* of work also, and great care must be taken that, in the desire of getting enough exercise in the twenty-four hours, it be not taken too quickly. To take exercise too quickly is like bolting one's food, and in both cases the end and aim of exercise and nutriment is defeated. It is far better to distribute one's exercise over the day, if such a course be possible, and an hour in the morning and another in the afternoon is better than attempting to concentrate one's exercise into two hours of excessive work. We may perhaps, with advantage, make a few remarks on the question of clothing and feeding during exercise.

It is of great importance that the lungs and heart, which are called upon for very much extra work, should be allowed as much room as possible for free play, and therefore anything at all tight round the chest or waist must be absolutely prohibited. All restraint on the limbs must be, as far as possible, removed; and such garments as are worn must be as loose as possible. Flannel is the best material, since it absorbs the increased amount of perspiration, and prevents chills. It is very important to remember to put on warm clothing directly the exercise ceases, and if the clothes be damp from exertion to change them, and rub the body dry. If these simple and obvious precautions were attended to, dangerous chills after exercise would be avoided.

*Diet* is an important question in relation to exercise, and there can be no doubt that many grave errors have been committed by trainers in the diet which they have allowed to athletes under their care. The mistake has been in restricting the diet too exclusively to nitrogenous matter, under the mistaken notion that the chief end of food was to repair waste. Undoubtedly nitrogenous matter in liberal quantities is necessary for a man in training, since the call upon his nitrogenous tissues is very great. Force producers are equally necessary, however; and no greater mistake can be made than in denying *fats* and *starches*. Provided that the food be of a wholesome and simple kind, and not excessive in quantity, the man's appetite and inclination is the best guide in the selection of a diet. Good roast or boiled meat, bread, potatoes, green vegetables, and farinaceous puddings made with milk, together with stewed fruits, may all be given with advantage. If green vegetables and fruits be denied, constipation and "training boils" are very apt to interfere with work.

No man should eat too soon after exercise, or when the body is fatigued. Under these circumstances, there is often not sufficient force to properly digest the food, and the troubles of indigestion will probably cause loss of sleeping power, if no more serious derangement.

#### CLEANLINESS AND CLOTHING.

Cleanliness is one of the chief means of securing and retaining health, and where cleanliness does not exist, perfect health is almost impossible. Unless the skin be kept clean, its functions are not properly performed; and the functions of the skin are as important as the functions of any other organ of the body. The most perfect way, probably, of cleansing the skin is to cause perspiration by exercise, and thus, as it were, flush out the innumerable pores with which it is studded, and then wash off the perspiration by immersion in water, accompanied by the movement of swimming. There can be no proper cleansing of the skin without an occasional tolerably copious perspiration, and this is one of the most cogent arguments in favour of brisk exercise.

Sweat is composed chiefly of water—*i.e.*, water constitutes 9,956 parts out of every 10,000. The remaining 44 parts are composed of 25 parts of salts, 18·8 parts of organic matter (scales from the skin, &c.), and the remaining parts of urea (a nitrogenous body found in the urine) and fat.

Sweat readily decomposes, and very soon becomes offensive; and clothing saturated with sweat, if not washed, becomes unwholesome for the wearer, and offensive to others.

There are many skin diseases which are directly attributable to want of cleanliness, and there is no disease of the skin which is not aggravated by it.

It is particularly necessary to cleanse carefully the skins of young children. The perspiration is very apt to accumulate and decompose in the folds of the skin of a fat baby, and irritating the skin, causes the disease known as *intertrigo* or *chafing*.

The invention of *soap* was a great boon (no one can say how great) to the human race. By its aid we are enabled to obtain comparative cleanliness without an extravagant use of water. Soap acts chiefly by its solvent action on the superficial scales of the skin, which it dissolves, removing at the same time the adherent dirt.

There can be no doubt that among people who are scrupulously clean there is far less risk of the conveyance of contagious diseases.

It has been shown that house painters and plumbers very much diminish their risk of contracting lead colic if they are careful to wash their hands before eating their meals, a precaution which they too often neglect, and thus the salts of lead in the paint, adhering to the food, are taken into the system.

Ophthalmia, or inflammation of the eyes, is another disease which is caused by want of cleanliness. In young children it is said to have been produced by the rubbing of the eyes of the child against the dirty breast of the mother. Ophthalmia is certainly conveyed from one to the other by the common use of towels, which get far too little washing, and by allowing the pillows and bed-clothes, which have



been, perhaps, fouled by the discharges from the eyes of a patient with ophthalmia, to be used, without previous washing, by another person.

The plan is very general in this country to bathe the whole of the body every day with cold water, and to follow this complete ablution with friction of the surface with rough towels. This plan is a most excellent one, and cannot be too strongly recommended. It is not, however, to be pushed too far, and is not to be persisted in when the weather is severely cold. The best test is to be found in the person's own sensations, and the readiness with which the reaction, or glowing of the skin, follows the application of the cold. If a cold bath be not taken daily a warm bath should be taken at intervals, but the practice of bathing in warm water must not be indulged in too often—not oftener than once a week.

The *hair* should always be kept scrupulously clean. The hair of children should be cut short, and should be washed with soap and water three or four times a week. If the hair be short this can be done without trouble, and since it is easily dried there is no risk of the child catching cold. The hair must also be carefully combed and thoroughly brushed. If this be not done, lice and vegetable fungi soon begin to breed and multiply in it.

Long hair is a luxury, and those who indulge in it ought to be prepared to give the necessary attention to it. The hair itself demands patient brushing and combing, and the skin of the head must be carefully cleaned with some oily or spirituous application. Soap and water is the best of all applications, even for a lady's hair, provided it be thoroughly rinsed in pure soft water afterwards.

The *mouth and teeth* ought to be kept scrupulously clean. The teeth should be thoroughly brushed night and morning. If this be not done, food collects in the interstices between the teeth, and, rapidly decomposing in the warm mouth, causes the breath to smell offensively. The presence of decomposing matter in the cavity through which the greater part of the air is drawn for the supply of the lungs cannot but be highly prejudicial to health. The mouth should always be rinsed out after eating, and a little *Condy's fluid* may advantageously be added to the water which is used for this purpose. If the teeth are imperfect, so that food readily lodges in them, they should be brushed after every meal. An observance of this plan would prevent many an attack of toothache. The frequent washing of the month prevents the accumulation of *tartar* on the teeth. The mouths of babies and young children should be washed with the most scrupulous care, in order to prevent *ulceration* and *thrush*.

We now pass on to make a few observations on the subject of *clothing*. We have classed clothing and cleanliness together, because a great cause of the dirtiness of the body is the dirtiness of the clothing. Among the poorer classes in this country the underclothing is seldom changed sufficiently often, and among hospital out-patients the body linen is generally visibly black and smells offensively. If we should ever come to have a compulsory military service in this country, we should gain, among other advantages, that a large proportion of the male population would acquire the habit of keeping their persons and their clothing scrupulously clean. It is much to be regretted that the habit is not general among the working classes here, as it is among the *ouvriers* of France and Belgium, of wearing a readily-washable blouse and pair of trousers in which to do their work. These blouses

may not be picturesque, but, at least, they are usually clean. The custom of some of our lower class workmen is to buy a coat, a hat, trousers, waistcoat, and boots at some grimy second-hand depôt. These garments he wears, or rather inhabits, till they almost drop off him. He works in them, eats and drinks in them, and not unfrequently debauches and sleeps in them. They are never brushed, washed, or cleaned in any way, and only those who are brought in contact with them can form any adequate conception of their foulness. It certainly would be better if the blue cotton blouse were to become a little more general. The saving of money would be great, the gain in health would be great also.

The object of clothing is to protect the body from extremes of heat and cold, and to retain the animal heat, and prevent its radiating too rapidly.

The colour of clothing should certainly be of some light shade during the summer, since it is well known that the sun's rays are absorbed far more readily by dark than light colours. Excepting during the extreme heat of summer, the colour is not important. The covering for the head should be of a light weight, so as not to press and cause discomfort on the forehead. It should be high in the crown so as to enclose a good layer of air between the crown of the head and the crown of the hat. This ensures both warmth and coolness. It should be ventilated so as to allow a free circulation of air in its interior. The eyes should be shaded by a peak in front, or a brim of some breadth, and in hot weather when there is danger of sun-stroke the nape of the neck should be protected either by a peak, or one of those falling veils called *puggerees*.

The head-dresses for men in the present day are tolerably sensible, and a great deal may be said even in favour of the much-abused "chimney-pot hat." Its great fault is, that it presents too large a surface to the wind, and is not so durable as it ought to be considering its cost. It is inferior to the "deer-stalking" hat in not having a rounded crown, off which the wind readily glances. The "deer-stalker" is probably quite as strong, and as capable of resisting blows. It should be made tolerably high in the crown. As regards ladies' hats, when these are required for use rather than ornament (!) the same considerations should hold good.

*Underclothing* should be of woollen material. These materials absorb the perspiration far more readily than cotton or linen. They absorb less heat, and allow less heat to pass through them from the body than either cotton or linen. Both for hot and cold climates they are to be preferred. In hot countries the woollen garments must be of fine texture, such as merino. The body should be completely covered with woollen under-vests, drawers, and socks. The white linen shirts which are very general are certainly a protection in a limited degree, but they must be looked upon mainly as decorative clothing. Clothing should allow of absolute freedom of movement to every part of the body. It must never be tight round the neck or the armholes, nor must it constrict the chest. A man or woman should always be able to draw the *fullest breath possible* without feeling any restraint imposed either across the chest or in the waist.

The habit of wearing stays or tight waistbelts, except in cases of disease, ought to be discontinued. It should be a legitimate inference that any woman requiring



these supports is not healthy. If she is healthy she cannot continue so for long if she persists in restraining the movements of her chest and abdomen with an apparatus of stout jean and steel.

Coats should never be tight across the chest. The best form of coat for a man is the open jacket of boyhood, and next to this the so-called "evening coat" which permits great freedom of movement. A few years ago this garment was generally worn in the day-time, and in this respect the present writer is inclined to be *laudator temporis acti*.

The neckcloth should always be loose. The collar should allow absolute freedom to the neck. The throat should never be coddled and over-protected. The more it is wrapped up the more it requires to be wrapped, and the greater is its liability to be affected by cold.

*Boots* must be easy and allow absolute freedom to the foot. The measure for a boot should be taken when the weight of the body is resting on the foot—*i.e.*, in the upright position, and not, as is too often the case, when the intending wearer is sitting down. The ankle boot now so generally worn is perhaps the best model. It is not too hot, and has not the fault of the shoe, of allowing the dust to get in over the "uppers." All boots should be stout enough to resist a moderate amount of wet. It is better to wear a stout boot than to trust to waterproof overshoes, which keep the feet very cold. The heel of a boot should not be too high, lest the weight of the body be thus thrown on the toes. We feel it is needless to point out the senseless absurdity of the fashionable ladies' boot, with its high heel and general want of room and all serviceable qualities. *Without a properly-constructed boot there can be no proper exercise, and without exercise there cannot be health.*

It would be far better if the children of the poor, whether at home or in the various asylums and schools where they are congregated, were accustomed to go without shoes or stockings. This habit is easily acquired, and would certainly be better for them than cramming their tender feet into ill-made, clumsy boots, of such weight and construction that any active exercise is impossible in them. Chilblains are very troublesome to all children in pauper schools. This is because of the sluggish circulation through the feet, due to depressed general health and inability to take active exercise. Let the boots be discarded, and one cause of chilblains will disappear.

Our remarks on clothing have been dictated solely from scientific considerations. As for "fashion," we can only say with Borachio, that he is "a deformed thief." The clothing of men has not undergone any great changes of late years, and the general tendency of "fashion" is towards increased simplicity. This we take to be the result of culture and mental training. As for the clothing of women, it is not two days alike, and the various changes are dictated neither by considerations of science, art, nor utility. When we see a fashionable lady limping along in high-heeled boots, with a hat of no possible service of any kind, with her dress trigged up behind in imitation of the anatomy of the Hottentot, and her train sweeping the horse-dung from the pavements, we feel that arguments addressed to her would be entirely useless. Let us hope that the "higher education" of which we hear so much may in time do something. Does any woman ever appear to greater advantage than in the simple riding-habit? *Verbum sap.*

BATHS AND MINERAL WATERS.

A human body which weighs 154 lbs. is composed of 66 lbs. of solid ingredients and 88 lbs. of water. It is evident, therefore, that water plays a most important part in the animal economy ; and it is not surprising that man should have sought, by the use of waters of various descriptions, both internally and externally, to influence the nutritive changes which are constantly going forward in the body. Water in its pure state consists merely of oxygen and hydrogen ; but in this pure state it is only met with in the laboratory of the chemist. It is the most powerful solvent known, and owing to this power, it is continually enriching itself. Even rain-water dissolves the carbonic acid and ammonia in the air ; and although rain-water, especially after a continuance of wet weather, is the purest water known, it is always very far from absolute purity. Water falling on the earth and percolating through it, or draining into rivers and water-courses, dissolves whatever soluble particles it may come across. Most *spring waters* contain saline ingredients, of which the most common are chalk, common salt, sulphate of lime, and sulphate and carbonate of magnesia. Thus spring waters are all of them weak mineral waters ; but the term mineral water is generally reserved for those waters containing mineral ingredients in quantity sufficient to impart a distinguishing taste, or to water containing some rare salt in solution. The richest of all mineral waters is sea-water, which contains in solution a great variety of saline matter. The following is the analysis of water from the British Channel :—

Water	.	.	.	.	.	.	.	963·74372
Chloride of Sodium (common salt)	.	.	.	.	.	.	.	28·05948
„ Potassium	.	.	.	.	.	.	.	0·76552
„ Magnesium	.	.	.	.	.	.	.	3·66658
Bromide of Magnesium	.	.	.	.	.	.	.	0·02929
Sulphate of Magnesia.	.	.	.	.	.	.	.	2·29578
„ Lime	.	.	.	.	.	.	.	1·40662
Carbonate of Lime	.	.	.	.	.	.	.	0·03301
Iodine	}	.	.	.	.	.	.	Traces.
Ammonia		.	.	.	.	.	.	
								1000·00000

Specific gravity, 1027·4.

Besides salts, mineral waters contain gases, the most common of which are carbonic acid (which we see bubbling up in seltzer water and many other mineral waters) and sulphuretted hydrogen, the gas which gives the peculiarly disagreeable odour and taste to the waters of Harrogate.

Mineral waters vary in temperature. Some of them are cold, others are very near the boiling point. These hot springs, of which there are very many throughout Europe, appear in the neighbourhood of volcanoes or spring from great depths in the rocks of earliest geological periods. Thus we have to consider these various waters which we find in nature as the vehicles of *saline matter*, *gases*, and *heat*, and sometimes we use a water for the sake of one property and sometimes for another.

We may now proceed to a consideration of the different kinds of baths.



The *cold bath* acts as a general stimulant. Its first effect is to chill and to cause slight depression, but reaction quickly follows, and the body glows with pleasant warmth, the absorption of oxygen by the lungs is increased, the appetite is augmented, and tissue change and nutrition are quickened. If a cold bath be continued for too long a time, or if the water be too cold, the period of reaction passes off and leaves the bather more or less permanently depressed. A bather should be exceedingly careful not to remain too long in the water. The time which it is safe to remain cannot be exactly stated, but must depend upon the strength of the bather and the temperature of the water. If cold baths be taken before breakfast they must be of short duration. They should not be taken too soon after a meal, or digestion may be arrested.

It must be remembered, *that in bathing, the skin absorbs neither the water nor any saline ingredient which may be dissolved in it.* It is not possible to get iron, or any other medicinal agent, into the system by means of the bath.

*Sea-baths*, owing to the salt dissolved in the sea, are more stimulating than simple cold baths. The sea is of a more equable temperature than river-water, and is generally warmer. The bather in the sea gets the benefit also of the sea-air. Whether a cold bath be taken in fresh or salt water, it is always advisable to swim in it, and add the effects of exercise to the other benefits.

The *sponge-bath* and the *shower-bath* are both methods of applying cold water, of which the former may be considered mild and the latter severe. In the shower-bath we get the extra depression and stimulation caused by the force of impact. It should only be used by those strong persons who take a natural pleasure in heroic and, to others, uncomfortable measures. By its means we certainly get a severe shock in a short time, and that is probably its chief merit.

By means of the *cold douche* we may apply cold water locally, as to a limb or a joint, and this is often useful. *Cold packing* in the wet sheet is a mode of applying cold greatly in vogue in hydropathic establishments. Cold bathing and cold packing have been much used of late years in the treatment of fevers, and both these methods have been found very efficacious in lowering the temperature.

*Tepid baths* from 85° to 95° feel neither hot nor cold. They have no appreciable depressing nor stimulating effect.

*Warm baths* from 96° to 104° cause reaction and an increased frequency of the pulse and redness of the skin.

*Hot baths* from 102° to 110° cause great frequency of pulse and respiration, great redness of the skin, and profuse perspiration.

*While cold baths stimulate to tissue change, warm baths may be said to favour it by their heat.*

A *vapour bath* produces profuse perspiration, and is a most effectual cleanser of the skin.

A *hot air bath* causes most profuse perspiration, so great, in fact, that a man may lose as much as 3 lbs. of weight during a single bath. They cause, also, great quickening of the pulse and respiration, redness of the skin, and elevation of the temperature.

A warm bath draws blood to the surface, while a cold bath favours internal

congestions. Warm baths must not be indulged in to excess, since they cause considerable depression of animal power. They cause drowsiness and lethargy.

*Mineral baths* are much used on the Continent, but since the mineral ingredients are in no case absorbed, they act only by their effect on the nerves of the skin. If we wish to increase the stimulating effect of water it is a common thing to add a little salt to it. Many of the mineral baths in great repute contain ingredients similar to those found in sea-water. Some of the mineral waters contain so little mineral matter that they are spoken of as "indifferent baths." The following is a list (taken from Braun's work on baths and mineral waters) of some of the more important :—

TABLE OF INDIFFERENT BATHS, SHOWING THE USUAL TEMPERATURE AND THE ELEVATION OF THE SITUATION ABOVE SEA-LEVEL.

Plombières . . . .	66° to 143° . . . .	1,310 Feet.
Leukerbad . . . .	102 „ 122 . . . .	4,670 „
Teplitz . . . .	99 „ 108 . . . .	648 „
Warmbrunn . . . .	104 — . . . .	1,100 „
Wiesbaden . . . .	93 „ 104 . . . .	323 „
Gastein . . . .	90 „ 104 . . . .	3,315 „
Tüffer . . . .	95 „ 102 . . . .	712 „
Römerbad . . . .	100 — . . . .	755 „
Pfaffer . . . .	100 — . . . .	2,115 „
Ragatz . . . .	100 — . . . .	1,510 „
Wildbad . . . .	95 — . . . .	1,323 „
Neuhaus . . . .	95 — . . . .	1,200 „
Sehlangenbad . . . .	86 „ 90 . . . .	920 „
Bertrich . . . .	90 — . . . .	500 „
Badenweiler . . . .	86 „ 90 . . . .	1,425 „
Landeek . . . .	87 „ 90 . . . .	1,398 „
Liebenzek . . . .	77 — . . . .	1,113 „

*In England.*

Bath . . . .	117 — . . . .	100 „
Buxton . . . .	82 — . . . .	1,000 „
Clifton . . . .	74 — . . . .	—

When the amount of saline matter is in larger proportion, they are called salt baths and sool baths. The most common "salt bath" employed in this country is naturally the sea, and it is probable that any good effects which are obtainable from inland salt waters are also to be got by sea-bathing. Many salt baths are situated in the neighbourhood of salt works, and are called brine baths, from the very large quantity of salt which they contain, a quantity which in some cases is so great that dilution of the water is necessary before it can be employed for bathing purposes. The strongest brine baths in this country are situated at Droitwich, Worcestershire. For the alleged advantages which flow from the use of these waters we must refer the reader to special treatises. The following table will show the exact constitution of some of the most characteristic of the salt waters which are used for bathing, and, to a less degree, for drinking also. For this table we are also indebted to Braun's work on "The Curative Effects of Baths and Waters," translated by Dr. Hermann Weber :—



## GASEOUS THERMAL SALT WATERS.

GRAINS IN 16 OZS.	NANHEIM.				KISSINGEN.		HOMBURG.		KREUZ- NACH.
	Kur- brunnen.	Diluted Kur- brunnen.	Salt Springs.	Diluted Salt Springs.	Ragozy.	Pandur.	Elizabeth.	Ludwig.	Ellenquelle.
Chloride of Sodium . . .	109.923	58.413	141.822	74.363	44.713	42.399	79.154	84.461	72.883
„ Potassium . . .	4.047	2.024	5.479	2.739	2.203	1.835	—	2.198	0.624
„ Calcium . . .	8.215	4.234	10.714	5.492	—	—	7.765	9.506	13.389
„ Magnesium . . .	2.155	1.173	2.102	1.146	2.333	1.625	7.767	6.001	4.071
Bromide of Sodium . . .	—	—	—	—	0.064	0.054	—	—	—
„ Magnesium . . .	0.295	0.148	0.400	0.200	—	—	—	—	0.278
Sulphate of Soda . . .	—	—	—	—	—	—	0.380	—	—
„ Magnesia . . .	—	—	—	—	4.508	—	—	—	—
„ Lime . . .	0.740	0.548	0.775	0.565	2.990	4.590	—	0.225	—
Bicarbonate of Lime . . .	11.558	7.540	11.904	7.713	8.148	7.793	10.982	9.796	1.693
„ Protoxide of Iron . . .	0.199	0.269	0.199	0.269	0.242	0.202	0.460	0.390	0.199
„ „ Man- ganese . . .	0.027	0.014	0.061	0.030	—	—	—	—	0.009
Carbonate of Magnesia . . .	—	0.149	—	0.940	—	—	2.011	0.046	1.351
Chloride of Lithia . . .	—	—	—	—	0.153	0.129	—	—	0.613
Silica . . .	0.115	0.119	0.153	0.137	0.099	0.131	0.315	0.125	0.129
Nitrate of Soda . . .	—	—	—	—	0.071	0.027	—	—	—
TOTAL . . .	137.274	74.702	173.609	92.848	65.702	60.289	108.828	112.752	94.023
Temperature, Fahr. . .	72°	59°	72.5°	60.12°	51.12°	51.12°	50 °	50.67°	54.5°
Carbonic Acid . . .	14.267	12.319	17.267	13.816	17.5	20.2	21.48	18.42	—

TABLE OF SALT BATHS SHOWING THE AMOUNT OF CHLORIDES IN 16 OUNCES OF WATER.

Salzungen . . .	1,997	grs. to 16 ozs.
Reichenhall . . .	1,736	„ „
Taxfeld . . .	1,970	„ „
Arnstadt . . .	1,811	„ „
Soden (Taunus) . . .	116	„ „
Kreuznach . . .	.77 to 122	„ „
Hall (Austria) . . .	100	„ „
Homburg . . .	95	„ „
Kissingen . . .	.45 to 137	„ „
Wiesbaden . . .	.45 to 58	„ „

A bath of medium strength should contain from 100 to 300 grains to the lb., so that concentration or dilution of some of the above may become necessary, and is practised.

These natural salt baths are stimulating in proportion to the salt which they contain. The carbonic acid gas, too, which adheres in bubbles to the surface of the bather's skin, is said to be very exciting and stimulating. The water of these baths should never be boiled, for in that way the contained gas is expelled, and the bather is deprived of its beneficial effect. The water should be (and is in the best bathing establishments) carefully heated to the required temperature by steam-pipes under the bottom of the bath. The temperature to be used in any particular case, the





There are many sulphur baths in the Pyrenees, the most celebrated of which are *Barèges*, 4,000 feet above the sea-level; *Eaux Bonnes*, 2,300 feet above the sea-level; and *Bagnères de Luchon*, 2,000 feet above the sea-level. These sulphur baths are used chiefly in cases of obstinate skin disease.

*Alkaline waters*, i.e., those which contain chiefly carbonate of soda and carbonic acid, are occasionally used for bathing, although the chief use made of these waters is for drinking.

*Steel waters*, or those containing iron, have been, and are still, used for bathing. Sir Francis Head's charming book, "*Bubbles from the Brunnen of Nassau*," contains an account of his journey to Langen-Schwalbach, to drink and bathe in the iron waters of that place. The following is an analysis of one of the springs chiefly used for bathing purposes:—

SCHWALBACH (PAULINEN-BRUNNEN), GRAINS IN 16 OZS.	
Bicarbonate of Protoxide of Iron . . . . .	·65
Bicarbonate of Soda . . . . .	·45
Chloride of Sodium . . . . .	·03
Sulphate of Soda . . . . .	·02
Bicarbonate of Lime . . . . .	2·95
Bicarbonate of Magnesia . . . . .	2·75
	<hr/>
	6·86
Carbonic Acid Gas . . . . .	39·5 cubic inches.

It is difficult to say what are the peculiar virtues of steel baths. The iron in the water is certainly not absorbed.

There are certain varieties of baths which are tolerably common in Germany which we must designate as "fancy baths."

*Moor, or mud baths*, are made with peat-earth stirred up with the water. These baths contain a mixture of mineral and organic matter. They are said to be useful in old cases of paralysis. They are to be got at *Marienbad*, *Franzensbad*, and *Teplitz*, in Bohemia, as well as elsewhere.

*Pine-leaf baths* are made of extract of the fresh leaves of the *Pinus sylvestris*. The odour of these baths is most delicious. They are of doubtful medical value, but are an undoubted luxury. They are to be got throughout Germany wherever the pine is abundant, and especially in the neighbourhood of the Black Forest.

As to the *drinking* of mineral waters we have anticipated much that we shall have to say on this matter in our remarks on baths. The drinking of pure water aids digestion by acting as a solvent on the food, but if taken in too large quantities it dilutes the gastric juice, and impairs the digestive power. Large quantities of water, or drink of any kind, should be avoided, both before meals, and while digestion is going on.

Systematic drinking of cold water assists tissue change, and helps both in the building up and breaking down which is constantly going on in the body. It increases the action of the skin and the kidneys, and the urine is found to be, not only greater in quantity, but also richer in urinary constituents. Cold water acts as a tonic to the stomach and bowels, and if taken when these are tolerably empty, is often found to act as a purgative.

Mineral waters are capable of subdivision.

1. *Chalybeate, or ferruginous waters.* Some of these contain carbonate of iron, and are reckoned the most digestible. They also contain carbonic acid. The most notable of these sources are, Tunbridge Wells, Harrogate, Orezza in Corsica, Schwalbach in Nassau, Pyrmont, and St. Moritz in the Engadine.

Others contain iron in the form of sulphate. Among these are the waters of Sand Rock in the Isle of Wight.

Iron waters are used chiefly for convalescents after severe illnesses, and for many conditions of poorness of blood. People of plethoric habit must avoid iron waters.

2. *Acidulous, or carbonated waters.*—These are chiefly pleasant table waters, and are said to be useful in dyspeptic persons with a tendency to gout or gravel. The best known of these are Seltzers, Neuenahr, Appollinaris, Taunus.

3. *Alkaline waters,* containing carbonate of soda and other alkalies. The best known of these is Vichy (temperature 53° to 110°), in France.

The following is the analysis of the Grande Grille Spring (Vichy). Temperature 113° :—

	Grains IN 16 ozs.
Bicarbonate of Soda . . . . .	37·5
„ Potash . . . . .	2·7
„ Magnesia . . . . .	2·3
„ Lime . . . . .	3·3
„ Protoxide of Iron . . . . .	0·03
Chloride of Sodium. . . . .	4·0
Silica . . . . .	0·5
Carbonic acid gas . . . . .	13 cubic inches.

These waters are chiefly useful in all gouty conditions.

4. *Purging, saline, or bitter waters.*—These contain sulphate of magnesia and soda. The best known are—Carlsbad, in Bohemia ; Friedrichshall ; Hunyadi Janos, in Hungary ; Pullna, Epsom, Cheltenham, Leamington, Seidlitz, Tarasp.

The following is an analysis of the Hunyadi Janos, which is, perhaps, the strongest bitter water known :—

ANALYSIS BY PROFESSOR BUNSEN, OF HEIDELBERG.

	In 10,000 parts were found
Sulphate of Soda . . . . .	225·514
„ Magnesia . . . . .	223·500
„ Potash . . . . .	1·206
Double carbonate of Soda . . . . .	6·760
„ „ Strontian . . . . .	0·270
„ „ Oxide of Iron . . . . .	0·006
„ „ Lime . . . . .	7·967
Chloride of Soda . . . . .	17·048
Silicious Salts . . . . .	0·106
Carbonic acid, free and half combined . . . . .	5·226

These bitter waters have a strong purgative action, and are indicated in all



eases of congestion of the liver and constipation. They are powerful medicines, and are not to be taken without advice.

5. *Salt Waters*.—These contain common salt and other chlorides. The best known are — Sea-water ; Kissingen, 50° ; Homburg, 52° ; Wiesbaden, 156° ; Baden-Baden, 155° ; Soden, in Nassau. These have alterative properties, and are chiefly used for bathing, but largely for drinking also.

6. *Calcareous Waters*.—Containing salts of lime and magnesia. These comprise all hard waters off the chalk—Buxton, 82° ; Bath, 88° to 112°.

The two last are useful in gout and rheumatism.

7. *Indifferent Thermal Springs*.—At these springs hot water is naturally cheap, and they are resorted to whenever hot bathing is thought advisable. They comprise Teplitz, 120° ; Wildbad, 110° ; Pfäfers, 100° ; Gastein, 95° to 118° ; Plombières, 83° ; Clifton, 85°.

8. *Sulphur Waters* (see Sulphur Baths).—These waters act as stimulants to the skin, and are chiefly used in chronic skin diseases.

In selecting a locality either for drinking or bathing in mineral waters, many other circumstances besides the quantity of mineral matter—purgative, alkaline, saline, or nauseous—contained in the water have to be considered. It must be confessed that the German bathing resorts are managed far more adroitly than those in this country, and patients visiting the German baths find themselves in many instances bound, or rather compelled, to follow a certain strict regimen. At Carlsbad, for example, the invalid finds it impossible to procure many of those articles of diet which are known to be hard of digestion or which interfere with health. Thus mustard and pepper, as well as salad, have to be dispensed with by all sojourners in Carlsbad. At some German watering-places butter and cheese are not permitted to the guests. There is no doubt a great advantage in sending a patient to a locality where, will he, nill he, he cannot get that which does him harm. Some of our English watering-places would do well to follow the example set them in Germany.

The position of the health resort is all-important, and the climatic peculiarities of the place have to be taken into account. The height above sea-level, the character of the soil, the amount and nature of the prevailing vegetation, the average temperature, and the rainfall, are all matters which require attention before selecting a locality for an invalid.

Of scarcely less importance is the sanitary condition of the town in which the spring may be, for it is manifestly absurd to send an invalid to be poisoned by sewer gas in some filthy ill-kept place. The amount of amusement, and the inducements to spend the day in the open air, are also of great importance. In all cases of illness it is necessary to provide recreation for the mind as well as medicine for the body. The following account (taken from the *Lancet*, Sept. 23, 1876) will give the reader an accurate notion of the kind of life which is led by visitors to one of the more quiet of the German watering-places :—

“The Kniebis baths are known to few even of the members of the medical profession, but are destined, if I mistake not, to fill a prominent position among fashionable health resorts ere the lapse of very many years. This group of watering-places is named

from its situation in the Black Forest, close to the range of hills called the Kniebis, whose summit forms the boundary between Baden and Wurtemberg. The main reason for prophesying a speedy renown beyond their own district (by the dwellers in which, for a century or so, these health resorts have been greatly frequented) lies in the fact that increased railway accommodation has rendered the locality more accessible. From Appenweiler and from Offenburg, on the Baden railway, run two branch lines into the interior of the Black Forest, and either from Oppenau, which is the termination of the first branch, or from Hausach, a station on the second branch, can the Kniebis baths be reached. In the first instance we come to the most north-westerly point, and in the second to the most south-easterly. There can be few pleasanter excursions than from Oppenau to Hausach, taking the baths *en route*. The group consists of five baths—viz., Antogast, Freiersbach, Petersthal, Griesbach, Rippoldsau, and I have enumerated them in what may be supposed to be the inverse order of their popularity. Of Antogast I know nothing, but propose to give a slight sketch of the other four.

“At each of these baths there are, as is usual at such places, three or four different springs, and it is probable that in the Kniebis district there may be thirty or forty, or even more, healing fountains; for it may be said, with some truth, of mineral waters that ‘it never rains but it pours.’ The truth of this would certainly be admitted in the Nassau district, and as certainly in this district of the Black Forest. The wells here are all very similar in composition, the chief ingredients being bicarbonates of lime and magnesia (the former in considerable quantity), sulphate of soda, potash, and magnesia (in not very large quantity), carbonate of iron sufficient to give a very decided chalybeate taste, and a large amount of free carbonic acid. They are indicated for all cases requiring iron, but especially for those cases of anæmia and chlorosis with a tendency to constipation, a tendency which the contained Glauber’s salt is sufficient to counteract.

“The elevation above the sea-level varies from 1,000 to 2,000 feet, Rippoldsau being the most elevated. The prevailing tree is the black pine, and, in fact, on the higher elevations there is nothing else, but in the lower valleys a great variety of trees is to be found—oak, limes, plane-trees, mountain-ash, chestnuts, &c. For those who require a pure forest air, and wish to inhale the fresh mountain breezes, redolent of the sweet odour of the pines, there can be no more desirable locality than these mountain baths. On the very summit of the Kniebis hill, more than 3,000 feet above sea-level, at the very comfortable although homely ‘Gasthaus zum Lamm,’ I encountered a consumptive gentleman who had been sent here to breathe the mountain air, according to the present ‘fashion’ (and fashion one must call it until we have more definite knowledge on the point) of treating consumption. His life certainly was a happy and a comfortable one here, and, although seriously ill, he seemed able to enjoy it. The air was keen and exhilarating, and the depths of the forest afforded a protection against the terrible fierceness of the sun, as well as against the violence of the wind; and here, in a hammock slung from two pine trees, inhaling the pine-laden air, lazily dozing, reading, or writing, this patient spent his days most happily, and indeed I could hardly conceive anything more calculated to eke out advantageously the vitality which remained to him. I remained



myself at this secluded spot for the best part of three days, and when the hour of departure came I left it with a most unusual regret, as one would leave a place which combined a beautiful and wholesome situation, tranquillity, simplicity of life, culture, good food, and a landlord at once obliging, talented, and amusing.

"But of the baths themselves, and of the life at them, what shall I say? No greater change can be conceived than to come, as I did, from Homburg to the Kniebis. They form as it were the very poles of bath life, and to my mind the escape from the fashionable crush and cosmopolitan society of Homburg to the simple life in these almost purely German resorts was a great relief. The Germans make the most of their baths; their sea-resorts being entirely on the north coast, and hardly suitable for pleasant autumn residences, they are compelled to come *inland* for change of air, and in a large majority of cases I believe that the mineral water serves merely as the excuse for going somewhere. In England, when pater-familias wants a change from his city work, he discovers that 'the children require sea-air,' and so it is, I believe, in Germany; and the anaemia of one serves as an excuse for the whole family to go to the Kniebis, Schwalbach, or elsewhere for their regular summer holiday. The German baths, with their enormous bath-houses, and their array of paraphernalia necessary for hotels and hospitals, are apt to astonish the traveller who regards them too rigidly from the point of view of actual sickness; but he who looks upon them as recreation-grounds, and resorts for prophylaxis as well as therapeutics, will soon cease wondering.

"Rippoldsau, Freiersbach, and Petersthal, all stand by the roadside. The high-road runs through the very centre of all of them, and the traveller on the diligence who may stay for ten minutes is admitted for the time being into the very arcana of bath life. The bath establishments at each of these villages are in the hands of one proprietor, such proprietor being, in fact, an hotel-keeper in a very large way of business. An arch, forming a communication between two wings of the building, stretches probably across the road, and instead of the sign of the Red Lion or the Kaiser, the words 'Bad Rippoldsau,' announce to the traveller that here is to be found healing in addition to board and lodging. These bath establishments remind one of the great old-fashioned inns which are found flanking the post-roads in some parts of England, and, indeed, my first glimpse of the house at Rippoldsau recalled to me the famous Montem Hotel near Windsor. In place, however, of the mail coach with four bays, stopping all steaming at the door, with the guard in scarlet livery rousing the echoes with "three feet of tin," one must be content with a lumbering diligence crawling at snail's pace, with Hans, the postboy, in shining hat and corded uniform, discoursing discord on a penny trumpet, and the postmeister with spectacled and official countenance taking his survey from his seat in the coupé. The accommodation at Rippoldsau is good, and although there is room enough probably for 1,000 guests or more, the demand this year has been in excess of the supply. This is due to increased facilities of access, and also, no doubt, to the fact that the Queen of Sweden has been making a lengthy sojourn here; for where Sovereigns go, there all other classes assuredly will follow. Mr. Cook, too, of tourist notoriety, has lately been paying his attentions to the Black Forest, so that for the future it will probably be as difficult here as it is elsewhere to get, for ever so short a space, 'far from the

madding crowd.' The six or eight enormous hofs, or mansions, which constitute Bad Rippoldsau are situated in a valley, the natural beauties of which would strike the most *blusé* of travellers. Richly-wooded hills; meadows, even during the scorching weather of the past August, literally green as emeralds; a babbling water-course making sweet music as it tumbles Rhineward down the valley; a variety of foliage difficult to surpass; a profusion of the gayest flowers; peasants, both male and female, decked in the smartest of costumes; houses remarkable for their neatness and picturesque homeliness; these, together with the lights and sounds which are characteristic of rural existence, go to make up a picture which cannot but be pleasing to the lover of nature, and doubly so to one who has been working amidst the murkiness and the noise of some manufacturing or money-making Babel.

"The daily routine is that common to baths. Up by times, and then to drink at the wells to the sound of music. And, as for the music, the least said the better. The bauds at the Kniebis are literally 'German bands,' and nothing is to be done save to put one's fingers in the ears. Such tootling, such braying in cornets, such hectoring, booming bass—such variations, in fact, of that melody which killed the cow, it has seldom been my lot to hear. Then breakfast beneath the trees, followed by a bath, a novel, a leisurely walk or a drive, till dinner-time. The baths are of all kinds, simple water or mineral water, and of any temperature; but the bath *par excellence* of the Black Forest is the bath to which extract of pine-tops is added, which is pleasant in the highest degree, and is certainly a sensuous luxury with or without therapeutic value—a question I feel unable to discuss, since I can find no data on which to ground a discussion. At one o'clock a bell summons the guests to dinner, which is served at an enormous *table d'hôte*, and after dinner comes the *dolce far niente*. Seated out of doors, with the sunlight flickering through the thick curtain of leaves, the men smoke, drink coffee, read newspapers, and discuss politics or Wagner (a great topic just now), or play with the children; while the ladies crochet, knit, prattle, read, and finally dose, as do also the men, until the heat has sufficiently abated to permit of the evening constitutional, which is taken in the lovely and well-kept paths which are cut in all directions in the forest. No one who has not been through the Black Forest can form any idea of what high-roads and public foot-paths can become if sufficient labour be spent upon them. I have seen nothing like them in England, except in the private parks of the very wealthy; and it is needless to say that these magnificent roads, well watered as they are, and almost without dust, are a great comfort, especially to invalids. At seven o'clock supper is taken—a great meal throughout Germany, and certainly very preferable to our eight o'clock dinners. At nine or ten all are in bed, and then at six in the morning *da capo*.

"Finally, we would say that in one respect these Kniebis baths are ahead of other similar establishments, and it is in this simple little matter, that they provide exercise for the upper limbs as well as the lower. In all baths there are to be found walks which encourage one to use the legs, but it is the especial glory of the Kniebis that it provides skittle and bowling-alleys for its guests; and at Rippoldsau there is, in addition, an excellent swimming-bath. Croquet, too, is becoming fashionable. These are trivial details, but by no means unimportant ones. Life is



made up of details, and a knowledge of these details is necessary for those whose duty it is to advise people '*Where to go.*'"

## SEWAGE AND DRAINAGE.

There is no more important question in the whole range of sanitary science than that of dealing with, and the best method of disposing of, our sewage. This question gets more and more pressing as populations go on increasing in density, and in this country at the present time it requires to be inquired into calmly and judiciously, and without prejudices of any kind. It is computed that in London the amount of solid human excrement to be disposed of amounts to nearly 100,000 tons annually, and that the amount of urine is something approaching 300,000,000 gallons.

This, however, constitutes but a very small proportion of the London sewage. It is probable that the excrement of the domestic animals nearly equals in amount that of the human beings, and in addition to this there is an enormous amount of waste products to be removed from slaughter-houses, manufactories, &c., as well as an incalculable amount of "dirty water" which has been used for cleansing persons, houses, streets, &c.

Now all this matter which we call "sewage" is putrescible, and, as is well known, very soon becomes intolerably offensive. This putrid matter gives out gases into the air, which it renders unwholesome, if not poisonous; and soaking into the ground filters into sources of water-supply, and thus proves highly dangerous in another manner. It has only one use, and that is as manure, and put upon the ground fertilises it, as we all know. The Chinese and Japanese, of all nations, have the keenest appreciation of the use of sewage, and it is their custom to collect it and apply it as manure with as little delay as possible. If manure be left to putrefy in heaps, its fertilising value is diminished, for instead of giving its store of nitrogen to the earth, and so to the plants which grow in it, it gives it to the air in the form of ammonia, where it is an offence to our senses and of no use to anybody. Many gaseous bodies besides ammonia are given off from decomposing sewage, and the gases themselves probably vary with the material of which the sewage is composed.

Sewer gas varies in composition. It is composed of a mixture of variable amounts of carbonic acid, sulphuretted hydrogen, carburetted hydrogen, ammonia, and organic particles, these last being often its most noxious ingredients. The poisonous qualities of sewer-gas vary immensely, depending partly upon its degree of dilution, and partly also on the special ingredients which it is liable to contain.

Cases of asphyxia occur occasionally in sewers, and at the opening of old cess-pools. At the opening of a privy at Clapham, twenty-three children were seized with violent vomiting, purging, headache, extreme prostration and convulsive twitchings, and two died within twenty-four hours.

It has been stated that those who work in sewers do not suffer as regards their health. This assertion is founded on the statement of Duehatelet, and appears to be hardly correct, for on examining his data it is found that, of the very small number of men from whom he drew his conclusions, only a small proportion of them had

worked more than a few months in the sewers, and that the majority had suffered from ophthalmia, "bilious and cerebral fevers," diarrhœa, jaundice, and colic.

If the atmosphere breathed by a population becomes contaminated by sewer-gas the health of that population suffers. Headache, sickness, diarrhœa, general malaise, and great depression of health, with anæmia, are liable to be produced.

It has been a matter of dispute whether or no typhoid fever can be conveyed by sewer-gas. There are many pros and cons in this question which we need not consider, but since there is much doubt on the point it will be safer to consider that its conveyance in this way is possible. There seems to be little doubt that the effluvia from typhoid evacuations are capable of producing the disease.

Moses seems to have had very definite notions of the evils which may result from decomposing sewage, and his law on this matter is surprisingly explicit, as the following quotation from Deuteronomy xxiii. 12, 13, will show:—

"Thou shalt have a place also without the camp whither thou shalt go forth abroad.

"And thou shalt have a paddle upon thy weapon; and it shall be, when thou wilt ease thyself abroad, thou shalt dig therewith, and shalt turn back and cover that which cometh from thee."

Thus it will be seen that the method of treating sewage by means of "earth" is no modern idea, but was definitely set forth by Moses 3,000 years ago.

In this way excrement is at once restored to the great purifier and deodoriser, the earth, which, in its turn, it helps to fatten.

Such a primitive method of getting rid of the excrement is clearly out of the question when masses are congregated in towns and cities.

Three questions seem mainly to be dealt with:—

1. How to deal with sewage at the place where it is formed.
2. How to convey it away from dwellings.
3. How ultimately to dispose of it so as to derive the maximum amount of benefit and the minimum amount of annoyance.

With regard to the first question, we must remember that sewage consists of three principal factors:—1. *Waste and surplus waters of all kinds*; and we must bear in mind that all water which is brought to a house or locality in the form of rain or by water-works, natural or artificial, or in the form of drinkables consumed by the inhabitants, has to be taken away again, since evaporation, in this country at least, is obviously insufficient for its removal. Waste water invariably finds its way by means of the natural or artificial drainage of the country, ultimately into the sea, either directly, or indirectly by means of the rivers. 2. *Waste products and the excrement of animals*, which are often kept for inordinately long periods, stored away in dung-heaps, polluting the air with that which should go to the land. 3. *Human excrement*.

The watery parts of sewage, with the exception of urine, are allowed to flow directly from the place of formation towards the sea, sometimes through natural, and sometimes through artificial, channels or sewers. Of the solid part of sewage, we have seen that such as form the ordinary constituents of the dung-heap are scattered upon the land after greater or less delay.



*Human excrements*, both solid and liquid, have been treated in various ways, and of these ways we shall speak in detail.

It has been the custom, and is still the custom to a great extent, to store up human excrement in simple pits dug in the earth. These pits are called *middens* or *cesspools*—middens when they are used as receptacles for refuse of all kinds, and cesspools when they are intended only for the reception of excrement.

Middens and cesspools are capable of poisoning the neighbouring inhabitants in two ways: first by leakage and secondly by the generation of gas which, if care be not taken, will escape into the dwelling-houses.

If a midden or cesspool be made in a porous soil, such as chalk or sandstone, leakage and percolation is sure to take place to an enormous extent, and any water-source in the neighbourhood will most certainly be contaminated. When the soil is porous the solid matters which are completely drained of all fluid, occupy far less space than they otherwise would, and are far less prone to decompose, so that these middens and cesspools in porous soils, causing, as they do, very little annoyance and requiring to be emptied very seldom, are most dangerously insidious contrivances. If simple pits are ever to be used for the purpose of storing sewage (and such a plan is perhaps in some parts of the country unavoidable), they should be made only in soils which are not pervious.

Another danger arising from the leakage and percolation of cesspools is the infiltration of the soil forming the foundations of the houses; and in many of the worst fever-dens in London the soil on which the houses are built has been found so infiltrated with decomposing sewage that the inhabitants literally lived, as it were, in the miasm given off from a "sewage marsh." If cesspools are constructed in porous soils they must be made impervious by artificial means, as cement.

A cesspool must be emptied at frequent intervals. It must also be ventilated by means of a grating, or else the gas generated in it will be forced back into the drain coming from the house. A cesspool is always a dangerous thing, and should receive constant and intelligent attention.

Some towns of considerable size are drained almost entirely into cesspools. The manure is then removed at regular intervals in vans, and put upon the land.

When we trust to water as the means for washing the sewage out of our house, this necessitates an elaborate system of subterranean sewers. Every house is in direct communication with these channels, in which enormous quantities of gas are necessarily generated as the sewage decomposes. It is very convenient to be able to flush the sewage of the house at once into the sewer, and if all the mechanism for effecting this be perfect, no harm results. It is obvious, however, that any imperfection in the trapping by the house-drain may admit sewer-gas into the house, and it is also evident that if there be any "tension" of the gas in the sewer, it may force its way back into the house.

There are many forms of house-traps, but they all consist, in principle, of the same thing—the interposition of a body of water between the sewer and the house. The so-called "**S** trap," from its likeness to the letter after which it is named, is in very common use. The bend of the **S** (which is placed horizontally) always remains full of water, and thus acts as a barrier against the gas in the sewer.

All traps, however, are only a very limited protection. The water in them soon absorbs the gas in the sewer, and gives it off into the house quite irrespective of any pressure. If the water in a trap be not constantly renewed it soon gets foul.

An anonymous writer in the *Times* of October 14, 1874, gives an admirable summary of the way in which sewer gas gets into a house. He says—"Sewer gas finds its way into a house by one or more of five distinct kinds of channels:—

"1. Sewer gas very frequently enters a house through the pipes which carry off the refuse water—for example, housemaids' sinks, butlers' pantry sinks, baths.

"As a rule, the pipes from these places are carried directly into the house drain. . . . It is easy to prevent the entrance into a house of sewer gas through these pipes. The pipes which carry off refuse water should terminate, *not in a drain, but in the open air*. In London houses they may pour the water directly into the area.

"2. Sewer gas may enter the house through the overflow pipes of the cisterns.

"Every cistern has a pipe to convey away the water, which, if the ball-cock of the cistern were out of order, would flood the house as often as the water came into the cistern.

"This overflow pipe of the cistern is frequently made to open into the soil-pipe of the nearest water-closet—*i.e.*, into a pipe filled with sewer gas.

"The overflow pipe of all cisterns should terminate in the open air.

"3. In towns the water-closets are at the *back* of the house, and the main sewer runs down the centre of the street in *front* of the house. The consequence is that a drain has to be made under the house from front to back.

"Injury to the walls of this drain may result from accumulated sewer gas, and the escape of sewer gas from the drain will be in proportion to the pressure of the sewer gas on the walls of the drain. To prevent this pressure the drain should be ventilated—*i.e.*, a pipe should be carried from the drain up the back of the house to a little below the level of the chimney-pots.

"4. A common practice is to make one pipe serve the double purpose of ventilating the sewer and of carrying off the rain-water from the roof. The pipe serving this double purpose is frequently a channel for the conveyance of sewer gas into a house. For every cubic foot of water that enters the pipe a cubic foot of sewer gas is forced out, and if, as is commonly the case, the top windows are near to the aperture of this pipe, sewer gas finds a ready entrance into the house.

"The pipe which conveys the rain-water from the roof should open into the area, and never into the drain.

"5. The soil-pipe of a water-closet, like the house drain, should always be ventilated—*i.e.*, an open pipe should pass from the soil-pipe to a little below the level of the chimneys, to an elevated spot, that is to say, at some distance from all openings leading into the house. If the soil-pipe of the water-closet be not ventilated, then, whenever the closet is used, should there be the least defect from wear, or accident in the trap, a certain amount of sewer gas will be forced upwards into the house from the soil-pipe."

It would be beyond our scope to deal with the method of constructing sewers, so that we pass by this question altogether and in conclusion make a few remarks on



the ultimate disposal of sewage. Opinions can hardly be said to be divided on the point now. Almost all are agreed that the only proper destination for sewage is the soil. In this way, it is not only rendered harmless, but profitable as well. "In this country we import nearly 60 per cent. of the wheat consumed, and throw our valuable sewage into the sea. Signs are not wanting, however, that municipal authorities, and private individuals, are equally becoming alive to the value of "sewage farms." When sewage cannot be applied to the land at once, it may be converted, by various means, into a dry manure, and as such commands a ready market. People very often make the mistake of expecting a large direct money profit from the employment of sewage for agricultural purposes; this can hardly be yet. Municipal authorities must expect to expend rather than to gain, at least, for some years, and if they do not get a large money dividend they are, at least, sure of dividend in the shape of *health*, the money value of which cannot be estimated.

## INFECTION AND DISINFECTION.

The ideas of the public on these two important subjects are, it is to be feared, very vague, and it must be confessed that the knowledge possessed, even by the most learned, is incomplete, and not always satisfactory. In the first place what do we know about the process of infection? Now we are in the habit of inoculating ourselves with the cow-pox, in order that we may escape the small-pox, and we know the limits of infection in respect of this cow-pox, most accurately. It is not conveyed by the air or by the clothing, nor by discharges from the body, and no case is on record of one person having "caught" cow-pox of another person. It is always necessary to take cow-pox matter from an infected person and actually insert it into the body of another person, before the disease can be conveyed. This cow-pox matter (vaccine lymph as it is called) can be kept for considerable lengths of time, and it is so kept, either in a liquid state, in tubes hermetically sealed; or, in a dry state, upon ivory points. Now here we have a disease capable, as far as we know, of only one method of infection. Can the infective power of the vaccine lymph, either in a liquid or dry state, be destroyed, or, as we are accustomed to say, can the liquid be *disinfected*? Dr. Baxter has, by careful experiment, answered this question with tolerable accuracy.

With *dry lymph* he found—

1. That its infective power was destroyed by exposure for thirty minutes to a temperature exceeding 194° Fahr.
2. By exposure for ten minutes to the vapour of sulphurous acid (the suffocating gas given off when sulphur is burnt, the odour of which is known to all who have used sulphur matches).
3. By exposure for thirty minutes to the vapour of *pure* carbolic acid.
4. By exposure for thirty minutes to the vapour of chlorine gas.

With moist lymph Dr. Baxter found that the infective power was destroyed—

1. By admixture with half per cent. of potassic permanganate (the salt contained in Condyl's fluid).

2. By admixture with two per cent. of carbolic acid.

Now it is considered highly probable that one reason at least why the cow-pox is never, practically speaking, conveyed except by direct inoculation, is the fact of the small amount of vaccine lymph which the person inoculated forms. If by inoculating with vaccine lymph we caused the person inoculated to be covered on his skin and on his lungs and intestines with myriads of pustules, as is the case in small-pox, the disease would probably become far less manageable, and it is at least possible that persons might be infected by inhaling or swallowing the matter given off by an infected person. Small-pox differs from cow-pox in the quantity of infective matter formed. This is certain. It is also almost certain that they differ in the virulence of the infective matter, but it is at the same time highly probable that there is some family resemblance, as it were, between the infective materials. It is exceedingly likely that small-pox poison is more difficult to destroy than cow-pox poison, but at the same time the infection-destroying agent found most useful in the one case is probably the most useful in the other.

*Small-pox* is a highly infective disease. It is highly dangerous, as has been shown over and over again, to go into a room or to ride in a cab which has been occupied by a patient with small-pox. That which is discharged from the skin of a small-pox patient is highly infectious, and it probably proves infectious by entering either the lungs or the stomach. The breath of a small-pox patient is infectious, and probably all the discharges from his body also. It is evident, therefore, that the rooms, the bedding, the clothing, and the discharges of a small-pox patient must all be subjected to disinfecting processes, before those who inhabit the same house with him can be considered safe. The discharges from the body are best disinfected by mixing with carbolic acid, the room and bedding by fumigation with sulphur, and the clothing by subjecting it to a great heat.

*Scarlet fever* is very infectious. All the discharges from the patient's body carry the infection, and especially the scales which peel off the skin. These scales remain infectious during the patient's convalescence, and they will convey the disease by letter or by being retained in clothing or bedding. Every means must be taken, by anointing with carbolic acid ointment, &c., to prevent the scales flying off the patient's body, and heat, and sulphur, and carbolic acid must be used for the discharges, the clothing, and the room.

Scarlet fever may be conveyed in milk, and probably, also, in other articles of food. This, probably, is brought about by people whose duty it is to prepare these articles of diet doing so before they have completely recovered, and unconsciously mixing infected scales with the food.

*Typhoid fever*, which is more properly called enteric fever, or fever of the intestines, is not conveyed at all, or is only in a very slight degree, by the air. This fever is admitted into all the hospitals of London, and, practically speaking, it never spreads. It is only infectious in one way, and that is by the discharge from the bowels. These discharges are terribly infectious, and if they find their way into a well or water-course, they may scatter the disease far and wide. The stools of a typhoid patient should be instantly disinfected by being mixed with strong carbolic acid, and then should be thrown down the sewer, or else deeply buried in some spot



remote from any source of water-supply. Simple washing of the clothes and bedding is sufficient.

*Cholera* is infectious in the same way as typhoid, and the stools and other discharges from a cholera patient must be instantly disinfected and then thrown away. Cholera is conveyed almost entirely by water. If it is ever conveyed by air, it is exceptional.

*Typhus fever*, otherwise known as famine fever, or gaol fever, is infectious through the air, and if patients with this fever be congregated together, the air becomes terribly pestilential. Typhus patients must be separated as much as possible, and enormous quantities of fresh air must be allowed. The clothes, rooms, and bedding must be disinfected by heat and sulphur, and the discharges by carbolic acid.

*Whooping-cough* and *Measles* are conveyed by the air, and are exceedingly infectious. It is not possible so to apply disinfectants as to influence the spread of these diseases.

Dr. Parkes gives the following directions for the *Purification of rooms after infectious diseases*:—"In addition to thorough cleansing of all wood-work by soft soap and water, to which a little carbolic acid has been added (one pint of the common liquid to three or four gallons of water), and to removal and washing of all fabrics which can be removed, and brushing of the walls, the room should be fumigated for three hours by either sulphurous or nitrous acids. Both of these are believed to be superior to chlorine, especially in small-pox. All doors and windows and the chimney being closed, and curtains taken down, sulphur is put in a metallic dish, a little spirit of wine is poured on it, and it is lighted. The proportion should be one pound of sulphur to every 1,000 cubic feet of space, and in a long room it is best to have the sulphur in two or three places. After three hours the doors and windows should be opened and kept open for twenty-four hours."

*Nitrous acid*, which has great disinfectant power, is evolved by putting a piece of copper in a vessel filled with nitric acid.

*Chlorine* is generally evolved from pans of chloride of lime, which are moistened with water and exposed. It may be got in greater quantity by pouring four parts by weight of strong hydrochloric acid on one part of powdered binoxide of manganese.

*Condy's fluid* is a powerful deodoriser. It may be exposed in a room in pans, and seems to have the power of destroying some of the "close" smells.

Dr. Baxter says, "Aërial disinfection, as commonly practised in the sick-room, is either useless or positively objectionable, owing to the false sense of security it is calculated to produce. To make the air of a room smell strongly of carbolic acid by scattering carbolic powder about the floor, or of chlorine by placing a tray of chloride of lime in a corner, is, so far as the destruction of specific contagia is concerned, an utterly futile proceeding."

*Dry heat* is one of the most powerful of all disinfectants, and if a temperature of 250° Fahr. can be obtained, it is doubtful if any infective particles can withstand it. Various forms of disinfecting chambers have been devised. In cases of emergency an ordinary baker's oven may be employed.





## SKIN DISEASES.

It is not proposed in the following pages to give the reader anything like an exhaustive treatise on skin diseases, but only to refer to those which by the possession of a little general knowledge may either be prevented or else readily cured. To make the subject more intelligible, it is desirable to devote a few words to considering what the skin is, and what it does. The skin, as every one knows, forms the outer covering of the body, adapting itself to all the inequalities of the surface, and whilst attached to the underlying tissues with varying degrees of looseness, readily permits the many movements which the muscles perform. The primary object of such a structure, then, will be to serve as a protection to the internal organs of the trunk and head and limbs. In man this purpose is not so effectively carried out as it is in many of the lower animals, where the skin is provided with such substances as scales, horny or bony plates. Another purpose served by the skin is to confine, to a certain extent, the heat of the body. During life we are continuously producing heat, and although much of it is as continuously being lost by evaporation and radiation from the surface, still, the skin does regulate and limit this loss. These deficiencies, if we may so call them, which our skin manifests are compensated for by clothes, which serve alike as a protection and as a further regulator of our temperature, this latter office being carried out in many of the lower animals by hairs, wool, feathers, &c. In the performance of the many and varied acts which are characteristic of living beings, and in the production of the heat of our bodies, we use up a certain amount of material, and give rise, in consequence, to a corresponding amount of waste, and just as a steam engine will not do its work without a due supply of fuel and water, so are we dependent on food and air, and equally as the engine produces a quantity of ashes and smoke, which must be removed lest the fire be choked up and the action of the machine interfered with, so must the ashes and the smoke resulting from the combustion of the food in animal bodies be got rid of. This work the skin aids in doing, and is therefore one of the important excretory organs of the body. In order that these various uses of the skin should be effectively attained, it must have the following properties and structure:—To allow of its adaptability to the surface and to movements, it must be soft, flexible, and elastic. That it may be protective it should be less sensitive than the structures which it covers; and to eliminate the waste materials it is provided with numerous glands which extract from the blood the constituents of the perspiration. The skin is usually described as being composed of two layers. The outer superficial layer, called the scarf skin, or cuticle, or epidermis, varies much in thickness in different situations, being usually thickest in the parts exposed to pressure, as the palms and soles. It is of itself, to all intents and purposes, a dead material, being without sensibility, and may be cut without bleeding. It is continually being thrown off on the surface as scurf, and as constantly being formed

in the deeper parts where it covers the true skin. The nails and hairs are modifications of the cuticle. The deep or true skin is, on the contrary, both sensitive and vascular, and it is from it that the blood escapes when the skin is wounded, and it is in virtue of the nerves ending in it that the skin possesses the general sense of touch. When the cuticle is removed, as may be done by a blister, the surface of the true skin which is left is exquisitely tender, and it is in protecting this delicate structure that one of the chief uses of the epidermis consists. In the thickness of the true skin (which is mainly composed of bundles of tough, flexible fibres felted together in all directions) are the sweat glands, which open on the surface of the cuticle by minute openings or pores.

It is obvious that the skin, from the very extent of it, no less than its position and structure, is liable to become diseased from many causes to which the other organs of the body are not exposed. Putting aside all those morbid conditions to which the skin is subject as the result of constitutional states, and in which the skin suffers only in common with other tissues, there remains a large class of affections, many of which are eminently preventible. The eruptions which are associated with gout, scrofula, the eruptive fevers, scurvy, &c., demand for their recognition and treatment a trained intelligence, and are beyond the scope of these remarks, whilst many of the purely local skin diseases are the result of sheer ignorance of simplest principles, and not only ignorance but careless inattention and disregard of what is writ very large in nature. Foremost among the causes of skin disease is dirt—dirt in every shape and form, often too obvious, sometimes less apparent on the surface, and requiring looking for, still, nevertheless, “matter in the wrong place.” There would, however, seem to be some difference in the kind of dirt, for we are not aware that sweeps, miners, blacksmiths, &c., in whom a dirty skin is more or less inseparable from their calling, are more prone to skin diseases than other people. The dirt that appears to be most harmful is the unremoved scurf and cutaneous secretions. Under ordinary circumstances the former falls off or is rubbed away by the friction of the clothes, and most of the perspiration escapes by evaporation. Washing—especially with soap, which from its alkaline nature softens the horny cuticle—materially aids in the removal of the secretion, and, further, keeps the pores of the skin open. Those garments, whether linen or flannel, which are worn next the skin are apt to become saturated with these waste matters, and if worn too long, to become sources of irritation. Besides the ill effects which directly follow want of clean linen, there are other evils which are very liable to ensue. A dirty skin offers a most favourable situation for the development of the numerous parasites, both animal and vegetable, that are so prone to infest our bodies. It is only in an indirect sense that dirt can be said to breed them. The spores or eggs must come from somewhere, but when once they do arrive their chances of development are in proportion to the dirty state of the surface. Many of the brown stains which are met with, especially between the shoulders and on the back, are due to a form of vegetable fungus which grows among the scales of the epidermis, and is very soon removed by soap and water. There are several other varieties of a similar parasite met with, one of them, the so-called “ringworm,” being among the commonest. This often very obstinate affection has nothing to do with any worm, but



is a microscopic form of fungus which tends to spread in a circular manner identical with the plan pursued by many of the larger forms. Those bald spots so often seen on the head are in many cases due to similar growths, which attacking the hairs also render them brittle and easily broken short off, leaving a surface at first covered with dry scurf and short hairs, afterwards often becoming smooth.

There are several forms of animal parasites which live and breed at our expense, and which often manifest a distinct choice of locality. The body lice which may be found on the surface generally differ from that species which is found among the hairs of the head, and these again both differ from the itch insect, which burrows into the thickness of the epidermis and deposits its eggs, especially on the hands and feet, whilst the nits or ova of the lice are fixed to the hairs. The intense itching which these pests give rise to induces scratching, and the skin becomes covered with numerous bleeding points, the blood drying and forming small hard crusts. Countless are the forms of irritation to which the skin may be exposed besides dirt. Extremes of temperature may produce disease short of actual destruction of the surface, as burns, scalds, and frost-bites. Erysipelas, or inflammation of the skin, not unfrequently follows exposure to heat, especially to that of the sun's rays, to which cause the less important bronzing of the cuticle is due, whether it be uniform or in spots (freckles). The materials used in various manufactures, sugar, dyes from socks and gloves, even flannel, silk, &c., are all liable to irritate the skin, and set up one form or another of disease, and the cause often requires a good deal of looking for. Even soap itself may produce in skins sufficiently sensitive an unhealthy state, and this is dependent on the amount of alkali that it contains, the common soaps being the worst in this respect. It is possible for there to be too much soap and water, and this is especially the case with the feet, which may be kept by it in a tender state, and not allowed to sufficiently harden to resist the friction of the boot.

Skin diseases present among themselves a considerable diversity of appearance. Some appear as patches of redness or brown discoloration, which may or may not be slightly raised; sometimes the redness is limited to small elevations termed pimples, and may so remain a considerable time. Certain eruptions commencing as pimples undergo a change, and appear after a time with small watery heads. An example of this group is shingles, which so curiously attacks only half the circumference of the body or limb. A very similar affection is frequently seen about the lips and ears. In other cases the pimples are surmounted with small heads of "matter;" such an eruption is said to be pustular. There is a distinction, too, of no small practical value, between those rashes that, extending over considerable areas of surface, present a dry and scaly appearance, owing to excessive formation and peeling off of the cuticle, and those which continually exude a thin, acrid discharge, sufficient of itself to extend the disease by the irritation it produces in the skin it flows over. Psoriasis is a type of the former group, and eczema of the latter, but numerous modifications of this general statement are met with, and not unfrequently it is a matter of the greatest difficulty to apply a name to an affection which may none the less readily yield to treatment. Some singular alterations in the skin secretions are occasionally found. In some people the

perspiration may be unduly excessive, in others it may be scanty, and occasionally limited to one-half of the body or face, the corresponding half never sweating, or it may shift from place to place. Rarely are seen alterations in the odour and colour of the secretion. Another material thrown off by the skin is known as the sebaceous matter, and is produced by small glands connected with the hair roots. Sometimes the orifices of these glands may be blocked up, and the secretion not being able to escape may continue to accumulate and form large rounded tumours—often several together on the scalp—known as “wens.”

Among the means at the disposal of the suffering public for the relief of skin diseases, without applying to the doctor, the most important are those at the same time both preventive and curative or palliative, foremost among them being habits of cleanliness in every way, in clothes no less than in the skin itself. The value of this has been sufficiently insisted on. The popular preference for soft rather than hard water is a reasonable one; but as regards soap, it is not always easy to make a selection among the many, each with its numerous vaunted virtues. Soap may often be made the vehicle for the application of drugs, such as sulphur, carbolic acid, belladonna, &c. We have seen that some parasites are killed by soap and water; but for most of these certain special applications are needed.

*Acne.*—This is one of the commonest of all skin diseases, and is a form of eruption with which most of us are more or less familiar. There are several different kinds of acne. We all know that young people—both young men and young women—are often troubled with little black spots on the face, not much bigger than a pin's head. They are commonly called “maggots,” or “maggot pimples,” and they constitute the simplest form of acne. Naturally there are found in the skin of the face and other parts very minute glands, which open by still more minute ducts at the side of each little hair, and secrete for it a kind of natural pomade. Sometimes, especially in growing lads and lasses, in whom the skin is active, these little glands pour out more of this pomade than is required, the ducts become distended with it, and so give rise to these spots. If you squeeze one of them between your nails, a little thing like a white maggot with a black head comes out; but it is not a maggot, but is simply this natural pomade being squeezed out from its duct by the pressure of your fingers. The black tip, or “head,” is simply the end of it which has been on the surface of the skin and has got dirty. It is quite true that parasites are sometimes found in this secretion, but they are microscopic, and you cannot see them with the naked eye.

These little spots are met with most commonly at the sides of the nose, on the forehead just at the margin of the hair, and at the corners of the mouth. Sometimes, too, they are found on the legs and over the knee-cap. As a rule they give rise to no trouble or inconvenience of any kind, but as they do not improve the complexion people are often very glad to get rid of them.

The best mode of *treatment*, if they are not very numerous, is to squeeze them out, although this involves a good deal of trouble and often some little pain. You may do it with your fingers, or you may press down the mouth of your watch-key over each little black spot. After the spots have been squeezed out it is as well to



apply some simple astringent lotion, such as spirit-and-water in equal parts, a strong solution of alum, eau-de-Cologne, or toilet vinegar. The red-wash (Pr. 93) will also be found useful for this purpose. Much, too, may be done by frequently washing the face with soap and hot water, taking care to use a very mild soap, such as glycerine soap, and then rubbing it well with a rough soft towel or a flesh-brush. Rubbing the face with a very fine smooth piece of pumice-stone is also a good plan. Should this treatment give rise to any roughness or irritation, a little glycerine of starch should be applied occasionally. Oatmeal-and-water is also cooling, and may be used when even the mildest soap is too irritating.

The greatest attention must be paid to the general health; dyspepsia must be combated (*see* DYSPEPSIA), constipation must be obviated (*see* CONSTIPATION), and the skin must be kept in a healthy condition by cold or tepid bathing and plenty of out-door exercise. In young women some menstrual derangement is often the origin of this kind of acne, and then the pulsatilla mixture (Pr. 43), two tea-spoonfuls every three hours for a week or two, will do good.

We often notice people who have "pimples" on the face. This, too, is a form of acne, and is generally known as "stone-pock." These spots are red in colour, are raised above the level of the skin, and are usually quite hard. They give rise to a sensation of tightness about the face, from the congestion and thickening of the skin they produce. They may last a long time, and not unfrequently leave nasty scars behind them. They are often caused by dyspepsia (*see* DYSPEPSIA) and chronic derangement of the stomach. When, in addition to these spots, there is pain in the chest after food, two table-spoonfuls of the gentian and soda mixture (Pr. 14), taken three times a day, half an hour before meals, will often do wonders. Nux vomica (Pr. 44) is also useful in this condition. Tea and all articles of diet likely to produce flatulence should be carefully avoided. Many cases of this variety of acne are associated with constipation, and the patient often dates the commencement of his improvement from a good purge. When there is great debility (*see* DEBILITY) and general want of tone, cod-liver oil or pancreatic emulsion, with such tonics as iron (Prs. 1—7), quinine (Prs. 10 and 11), and so on, will often do more good than anything. It is a good plan to give up the use of soap for a time, and to wash the face only with tepid water. The following lotion will be found most useful in these cases :—

Oxide of zinc, two drachms.  
Calamine (*the white, not the red*), half an ounce.  
Perchloride of mercury, one grain.  
Glycerine, two drachms.  
Elder-flower water, four ounces.  
Rose water to eight ounces.  
Mix for a Lotion. For external application only.

It should be applied three or four times a day with a small sponge, and allowed to dry on the face, the excess of powder being lightly dusted off with a handkerchief. This prescription, if carefully prepared, will be found of great value. The great point is to get the calamine almost colourless; as sold in the shops it is often of a deep red colour, and is then useless for our purpose.

The sulphide of calcium pills (Pr. 68) will be found useful in the treatment of this form of acne. One should be taken every three or four hours for some weeks. The sulphide of calcium powders (Pr. 78) will also be found efficacious. The sulphide of calcium treatment may be combined with the use of sulphur externally, the sulphur lotion (Pr. 91) being freely dabbed over the face with a soft towel three or four times a day. A little iodide of sulphur ointment rubbed into each spot is another good remedy ; it may be obtained from any chemist.

Bromide of potassium often does good in these cases. One or two tea-spoonfuls of the mixture (Pr. 31) should be taken every three hours, and, in addition, a bromide of potassium lotion—a drachm of the salt to an ounce of glycerine—may be rubbed into the spots from time to time.

Tar, too, is useful in acne. The tar pills (Pr. 70) may be taken, or any of the preparations mentioned in the article on this drug (*see* MATERIA MEDICA—TAR).

In obstinate cases arsenic (Pr. 40) may prove of use, though in acne it is not one of our best remedies.

The third and last form of acne we have to consider is known as “grog-blossom,” or “rosy-drop,” and is seldom met with in young people, although it is not uncommon in middle-aged men and women, especially the latter. The face is often greatly flushed, and is dotted over with bright red spots, some as large as a pea, and some even larger. It is often limited to the nose, but may affect the forehead, the chin, and the cheeks, and even extend over the whole of the face. It is usually made worse by mental emotion, by food and stimulants, by exposure to the sun, to the heat of a fire, or to a sharp, cutting wind. It is aggravated, too, by indigestion and constipation, and, in fact, by anything that tends to congest the face. It is not always due to over-indulgence in alcoholic liquors, but it must be admitted that sufferers from this complaint are generally addicted to the so-called pleasures of the table. It is usually very chronic in its course, and may last months, or even years. The treatment of this form of acne is essentially the same as that last described. Especial attention should be directed to the bowels and to the digestive functions. In these cases it is very necessary to avoid sugar, pastry, seasoned dishes, beer, spirits, and certainly port and sherry. When due to intemperance, little or no benefit will be derived unless the patient's habits can be controlled.

*Wens* are in many respects allied to acne, and the same mode of treatment may prove successful. As a rule, however, they have to be removed by a surgeon, and this may be done with very little pain or inconvenience.

*Eczema*, or “Tatter,” as it is sometimes called, is the commonest of all skin diseases. It is an inflammation of the skin, attended with a watery discharge, which on drying stiffens the linen with which it comes in contact. It is always moist at some period of its course, and may be regarded as a catarrh of the skin—a kind of bronchitis of the skin, in fact. It is generally constitutional, but may arise from purely local causes, and may even depend on the presence of some parasite, such as itch. It not unfrequently complicates or is associated with other skin diseases. It occurs on all parts of the body, but its commonest seats are behind the ears, at the corners of the mouth, and on the head. It is common at all ages, infants and young children being especially liable to it. It is said to be



most prevalent in the spring and autumn; but it is a chronic affection, and one meets with it all the year round. It may be brought on by anything that irritates the skin, especially when the constitution is debilitated. It generally begins in the form of slightly reddened patches, on which speedily appear minute watery heads or vesicles, which burst, leaving a small thin crust of a bright yellow colour. In bad cases the patches are not only vividly red, but are swollen, and feel hot and tense. Sometimes the discharge is thick, and cakes almost as soon as it is poured out, forming nasty, unsightly scabs. After a time the patches may cease discharging, and this makes the complaint rather less easy of recognition; but on inquiry it will be found that they used "to weep." When eczema attacks the head the viscid secretion mats the hairs together, and keeps them wet, sticky, and entangled. All forms of eczema are apt to become chronic, and it is often an intractable and distressing affection. It is prone to recur after complete recovery, and at each return it becomes less amenable to treatment.

Although eczema is an intractable, it is, fortunately, not an incurable disease. In fact, some cases may be readily cured by the very simplest treatment. This is especially the case when the eruption has been caused by some local irritant. It is not uncommonly met with on the hands of bakers—being then known as "baker's itch"—and on the hands and arms of washerwomen and housewives who do much washing or use strong soda. In these cases the removal of the exciting cause by a temporary change of occupation will often afford a speedy cure. In all forms of acute eczema, where there is much inflammation and discharge, a soothing treatment must be adopted. When there is much pain or itching, a poppy fomentation may be applied. When the pain is not severe, the calamine lotion recommended for acne (*see Acne*, p. 1009) should be used, taking care to apply it frequently, and to let the powder dry on. Another good application is benzoated zinc ointment smeared over the part with the finger, and then covered with a piece of soft lint. If the bowels are not freely open, a purgative should be taken: an aperient pill, such as Pr. 60, at bedtime, followed by a saline draught (Prs. 25, 26) in the morning. Anything that will act on the kidneys and cause an increased flow of urine will, as a rule, do good—as, for example, lemonade, couch-grass tea, decoction of sarsaparilla, or either of the cooling mixtures given in the article on Mindererus's Spirit (*see MATERIA MEDICA*). In more chronic cases, where the part has become caked and covered with hardened secretion, this simple treatment will not, as a rule, suffice, although even here it may do some good. The great thing in these cases is to apply a linseed-meal or bread poultice, and get off the scabs. Until this has been done thoroughly no local treatment can possibly do any good. It is of no use applying an ointment or lotion on the top of a scab, for it will not reach the skin, and will do no more good than if it were applied outside the clothes. When the scabs have been got rid of, the dilute white precipitate ointment (Pr. 89) may be applied with the finger or on a piece of lint. Great care must be taken to see that the ointment is fresh—anything rancid would irritate the skin, and do more harm than good. Vaseline forms a good dressing, and may be used instead of the ointment. In very chronic eczema, an ointment made with juniper tar—two drachms to the ounce of lard—will be found of service.

There are many other modes of treatment that may be resorted to under special circumstances, or when the complaint resists all ordinary measures. Thus, when the patches of eczema are large, and involve the whole of a limb, or even the greater part of the body, alkaline baths do good. An alkaline bath is made by dissolving four ounces of bicarbonate of soda in about thirty gallons of hot water (95° to 105° Fahr.). A size bath is also useful, and is made by dissolving two pounds of clarified size in the same quantity of water at the same temperature. The baths may be taken daily, and continued until the discharge has ceased. They are often a great comfort to the patient, allaying itching and that disagreeable feeling of tension so often present. When the alkaline bath cannot be obtained, or would entail too much trouble, the alkaline lotion (Pr. 90) may be applied freely with an old pocket-handkerchief several times a day. Another very excellent lotion may be made by adding two or three drachms of the strong solution of sub-acetate of lead to half a pint of water, and using it in the same way ; it allays inflammation, checks the discharge, and quells the itching, burning, and tingling. *Rhus toxicodendron* is a remedy that has obtained some reputation in the treatment of eczema. It may be given both internally or applied as a lotion. A mixture may be made by adding a small tea-spoonful of the strong tincture to an eight-ounce bottle of water, and of this a tea-spoonful should be taken every three hours. The lotion is made by adding two tea-spoonfuls of this same tincture to a pint of water, and the part should be kept constantly moist with lint soaked in it. It proves most successful when the parts are red and irritated and discharge freely, and when they itch much, especially at night. Another very good and very simple remedy for the itching of eczema is Friar's balsam, applied freely with a camel's-hair brush. When the patches have ceased discharging, and are white and scaly, the administration of arsenic often proves of the greatest use. It may be given in the form of the following mixture :—

Liquor arsenicalis (Fowler's solution), a drachm.  
Water, eight ounces.

A table-spoonful three times a day, after meals. Should it produce diarrhoea or vomiting, it may be taken as an indication for discontinuing the medicine or reducing the dose. This is for an adult, and a proportionately smaller quantity must be given to children, according to age.

In all cases of eczema it is of the greatest possible importance to attend to the general health. When dyspepsia and constipation are present, these must be remedied at once. Many a cure has been effected by simplifying the diet, avoiding entrées and pastry, and cutting off stimulants. Skin diseases often occur in gouty subjects, and then more good will be obtained from colchicum (Pr. 33), or from Vals or Lithia water, than from anything else. When, on the other hand, there is a general condition of debility, we give cod-liver oil, port wine, and tonics (Prs. 1, 2, 3, 4, 9, and 11, &c.). Parrish's chemical food and pancreatic emulsion are also useful. When there is much nervous depression, the gentian and acid mixture (Pr. 15) often does a great deal of good, bracing up the patient and giving him tone. For children of all ages cod-liver oil is useful.

*Psoriasis*, or *Lepra*, is a scaly disease of the skin. It generally commences in the



form of small white spots not larger than a split pea. The spots gradually increase in size till they may be as large as half-a-crown or a five-shilling piece, and after a time adjacent spots run together, forming irregular patches as large as the palm of the hand. The spots and patches are covered with thick white scales exhibiting a mother-of-pearl-like or even silvery lustre. If the scales are picked off, it will be found that the skin beneath is red and irritable, and perhaps bleeding from one or two little points. Sometimes the patches get better in the centre whilst they are spreading at the margin, and in this way the eruption gets converted into rings. There is an entire absence of discharge from beginning to end, and in this way it may be easily distinguished from eczema, which always " weeps," more or less.

Psoriasis may occur on any part of the body, but rarely attacks the face. It is very commonly met with on the back of the arms and on the front of the legs: in fact, a person suffering from psoriasis nearly always has a patch or two on the knee or elbow. It not unfrequently attacks the head. It attacks men oftener than women, and although it is met with at all ages, it is most common from fifteen to thirty. It is not contagious in any way. It may occur in an acute form, but, as a rule, it is a very chronic complaint. It may come out and spread all over the body in a week or two, and then disappear as rapidly as it came, but more frequently it lasts for months, or even years, getting better at one time and worse at another, but never completely going away. As a rule, the general health is not affected, and people go about their work or take their amusements much the same as usual. Fortunately its favourite seats are on parts covered by the clothes, and it gives rise to very little inconvenience, beyond perhaps a little itching or feeling of stiffness. It seems to be a constitutional and not a local disease, for it is sometimes hereditary, and often breaks out simultaneously on both sides of the body. Occasionally, too, it appears only under certain conditions of the system, as, for example, during pregnancy, disappearing at once on the birth of the child.

Psoriasis can, as a rule, be cured only by a judicious combination of internal and local remedies. Of internal remedies arsenic has by far the highest reputation. A drachm of liquor arsenicalis (Fowler's solution) should be added to eight ounces of water, and of this a table-spoonful should be taken three times a day. It is less likely to upset the stomach if taken after meals, but should it cause diarrhoea or sickness the dose must be reduced to a table-spoonful. Before making any local application the scales must be removed from the patches, and this may be done by poulticing, by warm baths, or by covering the part with rags soaked in oil and protected by oiled silk. As soon as the scales are off, an ointment, composed of two drachms of oil of cade (*Huile de Cade*) and an ounce of lard, may be lightly rubbed into the spots. Another efficacious application is tar ointment diluted with twice its weight of lard. There is one point to be borne in mind in connection with the administration of arsenic, and that is that for the first few days it may inflame the spots, and make them look worse than before the commencement of treatment. This, however, soon passes away, and the eruption then begins to heal in the centre. Arsenic always does more good in chronic cases than in the acute affection. It is a curious circumstance that tar in some form or other nearly always does good in psoriasis. Should arsenic fail to effect a cure, the tar pills (Pr. 70) may be taken

for a few weeks. Many doctors paint the patches with common liquid tar, leaving it on till it wears off. Phosphorus (Prs. 53 and 54) may be taken for a time in obstinate cases; the aperient iron mixture (Pr. 5) sometimes does good. Great attention must be paid to the general health. Plenty of out-door exercise, plenty of good nourishing food, and the avoidance of all stimulating fluids and seasoned articles of diet, with sugar and such things as pastry, pork, and veal, are very necessary. In children and young people cod-liver oil, extract of malt, or pancreatic emulsion will be found of service.

Of late chrysophanic acid, the active principle of goa powder or araroba powder—an Indian remedy for ringworm and other skin diseases—has been used with much success in the treatment of obstinate cases of psoriasis. It can be made into an ointment—a drachm, or even two drachms of chrysophanic acid to two ounces of lard—which has a light golden colour, and if scented with a few drops of otto of roses is very agreeable to use. It should be rubbed into the spots and patches night and morning for a few days. It will often effect a cure when the eruption has resisted treatment of all kinds for years. It is a powerful remedy, however, and has its disadvantages: thus it may stain the skin all round the patches so deeply that the discolouration will last for a considerable time; sometimes, too, it causes a little temporary irritation of the eyes; and, finally, it stains linen of a deep black colour. These are, undoubtedly, disadvantages; but, for all that, it may be used in obstinate cases, and with a very fair chance of effecting a cure. In Germany, patients with psoriasis are often kept in a tepid bath—at a temperature of about 90° F.—five hours a day for six weeks, with the happiest results. The treatment is tedious, and involves a great loss of time, but it is easy to devise an arrangement by which the water in the bath can be kept at a constant temperature, and reading and other sedentary work may be followed.

*Nettle-rash*, or *Urticaria*, is an eruption resembling in its characters the effect produced on the skin by contact with a nettle, and it is accompanied by similar burning and smarting. It consists of little white solid lumps, or elevations, called “wheals,” of an irregular shape, scattered over a bright red ground. They are hard, and do not contain fluid. The rash becomes much more marked after scratching or rubbing, so that it is possible by using the nail to write one’s name on the skin—so it is said. It is generally worse in the evening and after exposure to cold. Often enough it disappears rapidly from one part of the body and then comes out in another. It occurs most commonly in the spring and early summer; it is not contagious, and may attack the same person repeatedly. It is most frequently met with in ladies, and especially in those who are remarkable for the fineness and delicacy of the skin. Curiously enough, urticaria may sometimes be produced by particular articles of food, such as mussels, lobsters, crabs, and shrimps, and it has also been known to occur after eating pork, mushrooms, cucumber, strawberries, raspberries, almonds, oatmeal, pickles, and caviare. In fact, some people are so susceptible to it that the slightest error in diet or departure from the ordinary food will bring on an attack. It can also be induced by certain drugs, such as cubebs, copaiba, and perhaps capsicum. Sometimes the skin is so delicate that urticaria is produced by the slightest irritation, such as the bite of a flea or gnat, wearing flannel next the



skin, and so on. In most cases the rash lasts only a few hours, or at the outside a few days, but some people suffer from repeated attacks, so that they are hardly ever free from it. In its more acute forms the eruption is attended with a sharp attack of feverishness, accompanied by headache, nausea, and languor. The urticaria due to indigestible food is often attended with unpleasant symptoms. An hour or two after the lobster, or whatever it may be, has been taken, the patient complains of pain in the stomach, sickness, and faintness; there is much heat and irritation of the skin, with intolerable itching, and soon the eruption makes its appearance. It attacks chiefly the face, neck, and upper part of the body, but sometimes it spreads over the whole surface. Not unfrequently the inside of the throat and mouth become swollen, the unfortunate sufferer is extremely short of breath, and seems almost on the verge of suffocation. After a few hours the prominent symptoms subside, and in a day or two the patient is quite well again. If in the course of the attack vomiting or diarrhoea supervene, relief is at once experienced. Nettle-rash often gives rise to great alarm and inconvenience, but it is not a serious complaint or attended with any danger.

We have next to consider the treatment. When there is reason to suppose that the trouble is due to some noxious article of diet, it is best to get rid of it as soon as possible, and the emetic draught (Pr. 27) may be resorted to with this view. It may be followed by a good purge—the Rochelle draught (Pr. 26), for example, or a dose of Friedrichshall water. When there is much depression or prostration, a dose or two of sal volatile or chloric ether may be given with advantage. In other cases Mindererus's Spirit, taken in two tea-spoonful doses, in water, every four hours, may do good. When the complaint is chronic it frequently happens that it is caused by some one particular article of diet, and as soon as this is detected and given up the rash disappears. It has been recommended that each article of consumption should be omitted in turn for a day or two until the offender is detected.

There are many preparations that may be applied locally for allaying the itching. One of the best is the alkaline lotion (Pr. 90), which should be dabbed over the part with a small piece of sponge several times a day. A solution of cyanide of potassium in water—a drachm to the pint—is still more efficacious. An ointment composed of half a drachm of chloroform and an ounce of lard is often useful. Friar's balsam painted over the part might be tried in obstinate cases. Vinegar and water, applied on lint, is sometimes found useful in nettle-rash. Another plan is to rub the parts with slices of lemon. A full-length warm bath is useful, especially if a little bicarbonate of soda be added to the water. Relief will often be experienced by rubbing the body all over with cold cream. A lotion composed of tincture of green hellebore twenty drops, rectified spirit half an ounce, and water half an ounce, is another good remedy. For internal administration arsenic should be resorted to in obstinate cases. It may be given in four minim doses of Fowler's solution three times a day, as recommended for psoriasis. The stinging produced by contact with a nettle may be relieved by rubbing a dock-leaf over the part. For the stings of insects—gnats, ants, wasps, &c.—a little sal volatile rubbed over the part, or carbonate of soda or carbonate of potash, dissolved in water, will give almost immediate relief. Another good application is lime water; it may be readily prepared by

placing a small piece of quicklime in a tumblerful of water. In the absence of other remedies, a slice of common onion placed on the part will be found a good remedy for insect bites and stings; if the pieces of onion be removed every few minutes the pain is very quickly eased. Mosquito stings are peculiarly irritating, and when numerous may give rise to great depression. Fortunately, we are not much troubled with them in this country. It is said that they may be kept away at night by rubbing a little soap on the hands before retiring to rest. A far better plan, we should say, would be to smear the hands and face with the scented carbolic acid prepared especially for medicinal use. In the country nettle-tea is a popular remedy for all forms of urticaria.

*Freckles* are common enough, although they can hardly be regarded in the light of a disease. They consist of round yellowish spots, the size of a split pea or less, and occur not only on the face and hands, but on the parts covered by the dress. Those with fair skins and light hair are most subject to them. It is said they may be got rid of by the local application of common nitre. Some recommend that the nitre in fine powder should be slightly moistened and then laid on all over the face or part affected. Others think it better to touch each spot with a nitre crystal, which may easily be obtained by allowing them to deposit from solution in water. Friar's balsam, mixed with water, is another good application. The special preparation known by the fanciful name of "Virgin's milk" is said to be composed of Friar's balsam one part, and rose water twenty parts. It is used not only for freckles but for other eruptions of the face.

*Shingles*—from the Latin *cingulum*, a girdle—or "zona," as it is sometimes called, derives its name from the peculiar manner in which the spots constituting the eruption encircle one side of the body. The complaint is most common in the young, is of about equal frequency in the two sexes, and occurs particularly during sudden changes of weather. It is not in any way catching, but still, every now and then there is such a great increase in the number of cases ordinarily met with that it seems to be almost epidemic. It is an acute complaint, lasting from fourteen to twenty-one days. The patient is generally a little out of sorts for a few days before the eruption comes out, complains of headache, feverishness, confined bowels, and perhaps pain in the side; presently patches of redness appear on one side of the body—usually the right—and after a little time become covered with watery heads or blisters, not larger, as a rule, than a split pea. Sometimes two or three of these little bladders run together, forming a big one. These vesicles are at first tense and contain clear watery fluid, but soon they become flaccid and the fluid thicker. Soon, too, all redness disappears, and the spots dry up, leaving for a few days longer a nasty-looking crust or scab. Shingles nearly always occurs on one side of the body only, stopping short in the middle line both behind and in front, but in exceptional cases it appears on both sides simultaneously. There is a popular opinion that when the body is encircled by the spots the patient dies, but that, of course, is all nonsense. Sometimes the spots ulcerate, and they are then very difficult to get well. In any case the attack leaves the patient weak and neuralgic. Although the favourite seat of shingles is on the trunk, it may occur on the limbs, and in that case does not encircle them, but runs lengthwise, following the course of one of the nerves.



The *treatment* of zona is very simple. The patient should be confined to bed, or at all events to his room. The spots should be oiled over, and then sprinkled with flour from a dredger, and covered with two or three layers of cotton-wool. Should the fever run high, the aconite mixture (Pr. 38) may be taken for a day or two, or the quinine mixture (Pr. 9) for a somewhat longer period. It is important not to break the vesicles, and not to interfere with them more than necessary. Should the pain prove very great, the arsenic mixture (Pr. 40) may be substituted for the aconite, or we may apply poppy fomentations, or belladonna liniment and camphor liniment in equal parts. When there is very great weakness it may be necessary to give port wine and plenty of nourishing food, but in most cases the patient will do perfectly well on a simple unstimulating diet. When convalescence is established cod-liver oil should be given, with tonics, such as the citrate of iron mixture (Pr. 3), the quinine and iron mixture (Pr. 11), the gentian and acid mixture (Pr. 15), or, for a change, phosphorus (Prs. 53 and 54) or hypophosphite of lime (Pr. 55). The attack often leaves as a legacy a very obstinate neuralgia. Small blisters will relieve the pain, and other remedies will be found mentioned in the article on NEURALGIA.

The *Itch* (*Scabies*), or "Scotch fiddle," is a disease due to the presence of the itch insect in the skin. Scientifically this animal is known as the *Acarus scabiei*, and in appearance it is not unlike the creatures that may be seen by examining the dust of very old Stilton with a pocket lens. The presence of the acarus in the skin soon gives rise to intolerable itching, limited at first to the hands and fore-arms, the lower part of the belly, and upper part of the thighs, but soon spreading over the whole of the body, with the exception perhaps of the face and head. The itching is nearly always worse at night, as soon as the patient gets warm in bed. The irritation results in scratching: this causes an eruption, which discharges, the secretion drying into nasty, unsightly crusts. The acarus burrows under the skin, leaving a little black line a third of an inch or less in length, and shaped like a comma or the letter "S." This is very characteristic of itch, and is readily recognised by the practised observer, but those who are fortunate enough not to have had much experience in such matters would in all probability fail to detect it. Scabies occurs both in children and in adults, and at all ages and in all conditions of people. As a rule it commences on the hands or fore-arms, and if the eruption began elsewhere the probabilities are against its being itch. We need hardly say that it is contagious, and may be conveyed by contact from one person to another.

There is a remedy for the itch which from time immemorial has been regarded as a specific, and that is, sulphur. There is no occasion to take it internally, and it is quite sufficient to apply it locally. It is best to use the sulphur ointment of the Pharmacopœia mixed with an equal quantity of lard. The way to set about it is this: At bed-time you have a fire lighted in your room, and you take a hot bath as hot as can be borne; you stay in it some time, soaping yourself all over, except the head and face, and rubbing the skin well with your hands or a flesh-brush. For a child the soap must be mild, or the skin will get very irritable, but for an adult a strong soap may be used. After the bath you dry yourself thoroughly before the fire with warm towels. You then proceed to anoint the skin with the sulphur ointment,

rubbing it well in all over the body, not forgetting the hands, especially between the fingers. The smell of the ointment is not very nice, but a little otto of roses or some other agreeable scent will obviate this. When the anointing is finished, you allow the ointment to remain on, and go to bed in your night-gown, wearing no flannel. In the morning you take another hot bath, so as to get rid of the ointment, and put on all clean things, giving orders to have your sheets changed. This will generally effect a cure in one night. You must be careful, and not be too energetic in your treatment, or you may not only cure the itch, but go farther and set up eczema, which is almost as bad.

If we attack the disease quite early, and when it is confined to the hands and wrists, a simpler mode of treatment may suffice. Get an ointment made as follows :—

Sulphur, half a drachm.  
White precipitate, four grains.  
Creasote, four drops.  
Oil of chamomile, ten drops.  
Lard, one ounce.

Rub it well into the parts night and morning for three days, especially between the fingers. On the morning of the fourth day a warm bath is given and all the linen is changed.

Another good remedy for itch is “balsam of sulphur,” made by dissolving sulphur in warm olive oil. It is applied externally in much the same way as the ointment. One or two sulphur vapour baths will be found of use in obstinate cases, but it is rare that one or other of the methods we have indicated will not effect a cure. When the treatment has set up irritation of the skin, it is a good plan to discontinue the sulphur ointment for a few days, and use the calamine lotion recommended for ACNE. When itch breaks out in a family, it is best to treat the whole of them simultaneously, so as to get rid of it completely at once. All linen should be boiled, and other garments should be ironed with a hot iron, or exposed to hot air of a temperature of not less than 160° Fahr.

*Phthiriasis*.—This is a disease caused by the presence of lice in the head or on the body. The subject is an unpleasant one, and we shall deal with it briefly.

When the disease attacks the head, smear the hair well with the dilute white precipitate ointment (Pr. 89), to which a few drops of oil of rosemary may be added. Let it remain on for some hours, then wash thoroughly with soap and water, and use a small-tooth comb. Another good application is staphisagria ointment, two drachms of the ground seeds to an ounce of lard. It may be used as it is, or a better way is to digest the seeds with the lard in the oven for a few hours, and then strain through muslin whilst hot. The ointment may be rubbed on the head freely without danger of any kind. In bad cases it may be necessary to cut off all the hair, with the exception of a fringe to show under the cap in front. The “nits,” or eggs, may be got rid of by washing the hair first with vinegar and water, and then with plain water.

When the disease attacks the body, a hot bath should be taken morning and evening, the skin should be rubbed over with the dilute white precipitate ointment (Pr. 89) scented with rosemary, and the body-linen and bed-clothes should be



changed frequently. The linen must be boiled, and the clothes should be ironed with a hot iron. Dusting the skin and shirt with powdered *Pyrethrum rosea*, or "insect powder," will sometimes effect a cure. It often happens that the skin itself is in an unhealthy condition, and the general health below par. Should this be the case, plenty of good food, cod-liver oil, and tonics will do good.

*Ringworm*.—The subject of ringworm has already received full discussion in the articles on DISEASES OF CHILDREN, but there are still one or two points to which we wish to draw attention. In the first place, it should be distinctly understood that the existence of this complaint is an indication that the patient is in bad health. Many doctors rely largely on change of air and a liberal allowance of meat, puddings, bread and cheese, milk, steel, and arsenic in its treatment. They may not be wholly right, but still it is a point worth bearing in mind, and there can be no harm in feeding up the patient. In many cases the first sign of improvement dates from the administration of cod-liver oil. It is said that children who suffer from ringworm nearly always dislike fat, and this may afford an indication for treatment. In very obstinate cases, the chrysophanic acid recommended for Psoriasis may be tried.

Then, again, after ringworm the hair often remains weak for a time, and it may be desirable to know what to do to stimulate its growth and strengthen it. The following application will be found effective :—

Tincture of nux-vomica, three drachms.  
Distilled vinegar, two and a half ounces.  
Tincture of capsicum, one drachm.  
Tincture of cantharides, six drachms.  
Spirit of rosemary, one ounce.  
Rose water to six ounces.

Make a lotion. For external application only.

It may be scented in any way that is thought desirable, and should be rubbed into the roots of the hair with a small sponge. It is poisonous, and must not be taken internally.

Where ringworm breaks out in a family, the greatest care should be taken to prevent it from spreading. Absolute cleanliness, including frequent washing with soap and hot water, is most essential. The affected child should be isolated, and must on no account be brought in contact with other children. Such things as towels, brushes and combs, comforters, caps, and so on, must never be used in common by the infected and the healthy. A dry state of the head and hair is found to be favourable to infection, whilst the presence of greasy applications has the opposite effect, so that it is a good plan to use pomade freely. Those who object to pomade may use a lotion made as follows :—

Strong acetic acid, half an ounce.  
Glycerine, two drachms.  
Carbolic acid, half a drachm.  
Elder-flower water, three ounces.  
Rose water to six ounces.

Make a lotion. For external application only.

It may be sponged over the head once or twice a day, and will be found very

efficacious in warding off infection. If an epidemic of ringworm break out in a school—and unfortunately such things do occur—this lotion should be used pretty freely. It is necessary, too, to examine carefully the heads of all the children, so as to detect the earliest trace of the disease, and at once to isolate those who have caught it. Children suffering from ringworm should not be allowed in the same room with healthy children. They should use nothing in common, and if possible they should have a different attendant. The general hygienic conditions of the establishment should be looked into, the rooms should be thoroughly ventilated, the diet should be improved, and the children should do little if any work, and should have plenty of out-door exercise.

From ringworm we pass on to *the hair, its management and diseases*. The first thing to remember is that it must always be kept clean. Many people object to washing it, because they say they are apt to catch cold after it, and the soap makes the hair rough and harsh. This is true to some extent, but it is a difficulty that can be easily overcome. To avoid catching cold, wash the head in warm or tepid water, and then dry it thoroughly with a bath towel. The argument in favour of catching cold would apply equally well to not washing at all. It is true that soap removes the natural pomade from the hair, but there are such things as artificial pomades, and most of us use them in some form or other. Then one is not obliged to use soap for washing the head. Take the yolk of an unboiled egg, mix it with a little water, and rub it well into the hair, finally rinsing with plenty of warm water. There is nothing like washing the head often, and it will do more than anything to make the hair strong and healthy. Brushing does good, and if used with anything like moderation can never do harm. It is best to use a brush with good long bristles, and the finer the hair the softer should be the brush. “Brushing by machinery” is not, as a rule, harmful, but when there is a tendency to baldness it should not be used very frequently. The hair should be cut periodically and regularly. The practice of allowing delicate children to wear the hair long is a bad one, and they often suffer from it. Singeing the hair is an invention of the hair-dresser, and there is no evidence that it in any way strengthens its growth.

*Grey Hair*.—Probably the commonest of all complaints about the hair is that it is getting grey. As years go on the grey hairs appear, first on the temples, and then over the whole of the head. Some people are grey from birth, and this peculiarity is met with in its most complete form in “albinos,” who are destitute of pigment or colouring matter of any kind. In these people the hair of the head has usually a pearly-white colour, whilst the short hairs of the body are exceedingly fine and soft. Premature greyness is undoubtedly hereditary. Sometimes it follows a severe illness, or it may be the result of depressing nervous influences, such as worry and anxiety, or hard mental work, combined with a sedentary life. Sometimes the mischief is due to a local cause, as in neuralgia, for example, where the nerve presiding over the nutrition of the part is at fault. Sometimes, as every one knows, the hair turns white in a single night from intense fear or anxiety. The case, for example, is related of a rebel sepoy of the Bengal army who was taken prisoner, and brought before the authorities for examination:—“Divested of his uniform, and stripped completely naked, he was surrounded by the soldiers, and



then first apparently became alive to the dangers of his position. He trembled violently, intense horror and despair were depicted in his countenance; and, although he answered the questions put to him, he seemed almost stupefied with fear. While actually under observation, and within the space of half-an-hour, his hair became grey on every portion of his head, it having been when he came into court of jet-black colour. It is said that the attention of the bystanders was first attracted by the sergeant, whose prisoner he was, exclaiming, 'He is turning grey!' and gradually, but decidedly, the change went on before them all, till in the space of half-an-hour it was complete." This is, perhaps, one of the most striking cases ever recorded. When the change takes place in early life there is a hope that the original colour may in time be regained.

*Hair Dyes.*—We must say a word or two about hair dyes, for the practice of dyeing the hair has existed from the earliest times and amongst the most celebrated and eminent nations. It was sanctioned and practised by both the Greeks and Romans, and from them the custom spread over nearly the whole of the civilised world. In mediæval Venice it was considered the height of fashion to have the hair dyed several different colours. Now-a-days we are satisfied with one colour—with one at a time, at all events. There are a good many preparations advertised for dyeing hair black, and they nearly all contain lead. Some year or two ago twenty-one specimens of hair dye were analysed, and of these fourteen were found to be practically identical in composition. They contained lead and sulphur, and most of them were "warranted" to be "perfectly harmless" and "free from injurious substances." One of the commonest ways of dyeing the hair black is the following: a solution of from ten to twenty grains of acetate of lead in an ounce of water is applied to the hair, and as soon as this has in some measure dried, the hair is wetted with a solution of sulphide of ammonium. The darkness of the tint produced is in proportion to the strength of the acetate of lead solution employed. When it is required to produce a jet-black, twenty grains to the ounce will be the right proportion; but when only a brown colour is desired, ten grains will suffice. We are not at all prepared to say that this is a harmless application; it contains a large quantity of lead, and if used for some time it might produce symptoms of lead poisoning. Another wash for making the hair dark is composed of acetate of lead and sulphur, of each a drachm, added to eight ounces of distilled water. It may be used at first night and morning, and then, as the colour of the hair improves, once a day, or two or three times a week only. It soon changes red hair to light brown, and is valuable for this purpose. Before applying this, or, in fact, any dye, the hair should be thoroughly freed from all grease; this is best done by washing it with eau-de-Cologne and water, or cleaning it with yolk of egg. To produce a permanent brown colour, two solutions are generally used—one being made by dissolving four grains of sulphate of copper in an ounce of water, and the other by dissolving four grains of ferrocyanide of potassium in an ounce of water. They are to be applied to the hair alternately with a small sponge or brush. A solution of permanganate of potash—Condy's fluid will do very well—also produces a good brown, and is often used as an application to a small, fluffy, light-coloured moustache. Preparations used for lightening the colour of the hair are almost invariably composed of peroxide of

hydrogen. This substance has the peculiar property of imparting to the hair an almost metallic lustre, and it does not appear to be especially injurious.

*Baldness.*—Loss of hair, or premature baldness, is often a source of inconvenience and annoyance. It may be that there is only a little patch of baldness, or the hair may be lost over almost the whole of the head. It may result from neglected ringworm, or some similar complaint, but when general, it is in the majority of cases constitutional. Mode of life has undoubtedly an influence on the development of the hair. Those who spend most of their time in the open air—sailors, for example—rarely suffer from premature baldness. The custom of wearing smoking-caps and night-caps certainly makes the hair less strong and vigorous. Fortunately, a good deal may be done to stimulate the growth of the hair. The first thing is to look to the general health, and should dyspepsia or constipation be suffered from, in even the slightest degree, this must be set right as a preliminary measure. When there is debility, this must be treated with cod-liver oil, iron, quinine, Parrish's chemical food, arsenic, nux vomica, and so on. When there is any suspicion of a syphilitic taint, this too must be got rid of. Having thus paved the way, we may resort to local measures. We try and get the scalp soft and supple, first by poulticing with linseed-meal, then by frequent ablution with hot water, or by the application of glycerine and lime water, or olive oil and lime water, night and morning for a week or two. We then use either one or other of these two lotions once or twice a day. The first is:—Tincture of cantharides, an ounce; distilled vinegar, an ounce and a half; glycerine, a drachm and a half; spirits of rosemary, an ounce and a half; elder-flower water, three ounces; and rose water to eight ounces. The second is made as follows:—Twenty grains of borax are dissolved in two ounces of distilled water, and to this are added carefully, little by little, two drachms of oil of sweet almonds, and then four ounces of laurel water. Another good local application is a saturated solution of phosphorus in ether. The head may be poulticed at night, and the phosphorus dabbed on in the morning. Tincture of iodine is a useful stimulant to the scalp, but it temporarily discolours the skin, and should not be used if the patient wants to be about, unless he can wear a cap. When short downy hairs are beginning to make their appearance, the head may be carefully shaved every fortnight. The green colour of many pomades used for stimulating the growth of the hair is due to the presence of rosemary. Rosemary is supposed to have the singular property of preventing the hair from uncurling when exposed to a damp atmosphere, and it has been used for this purpose from the most ancient times.

*Superfluous Hairs* are often a source of trouble and annoyance. Every now and then well authenticated cases are recorded of children who acquire a growth of long hair all over the body, like an ape. More commonly superfluous hairs are found on warts and moles, or hairy patches spring up after the application of a blister, especially if kept open for some time. Young women are often greatly troubled by the appearance of a few long scattered hairs upon the upper lip or chin, resembling an abortive moustache or beard. It is apt to increase as years go on, causing much annoyance from the attention it attracts. It is often associated with some derangement of the health, and especially with irregularity of the uterine functions.



*Skin Eruptions from Poisonous Clothing.*—It is only right that it should be known that skin eruptions are very frequently produced by wearing articles of clothing coloured with aniline dyes. These aniline dyes are obtained from coal-tar, and are met with of all colours—blue, green, red, yellow, lake, and so on. They are extensively used for colouring wools, for dyeing vests, the linings of gloves and hats, and, in fact, almost every article of clothing we wear. In some people they seem to do very little harm, whilst in others they produce most marked symptoms. Quite recently the case was recorded in one of the medical papers of a man who bought a new felt hat. After wearing it for a very short time he suffered from a severe headache, and an eruption appeared on his forehead, attended at first with swelling, and subsequently with the formation of matter. His eyes, too, became much inflamed, and were almost closed. Something directed attention to the hat; the brown lining was examined by a competent authority, and was found to be coloured with a poisonous aniline dye. Such cases are of constant occurrence. These aniline dyes cause the greatest irritation in hot weather, when the skin perspires freely. It is found, too, that many gay-coloured articles of dress contain arsenic in addition to the coal-tar dye. The symptoms produced vary somewhat in different cases; usually, however, there is redness and staining of the part, followed by swelling, itching, and smarting, with perhaps the formation of little watery heads or vesicles. Often enough, too, there is considerable constitutional disturbance, and the patient feels thoroughly ill and knocked up. We have little to suggest in the way of treatment; in fact, hardly any is requisite. The great thing is to detect the source of the mischief, and then to get rid of it. It may be a pair of socks, or a red chest protector, or a flannel waistcoat, or a new pair of gloves, or, in fact, anything. The great thing is to remember this possible source of mischief, and when it does occur to seek carefully for the cause.







SIR JAMES YOUNG SIMPSON.

*(From a Photograph by John Moffat.)*





## BONE SETTERS AND "BONE SETTING."

NOT a few of the means adopted for the relief of suffering humanity by medical men are derived from sources that are anything but orthodox. Most of the drugs enumerated in the British Pharmacopœia—that authorised cookery book of doctors—owe their position there to a popular opinion of their efficacy. The herb whose medicinal virtues has been long recognised by the old wives and herbalists of a country side gradually comes under the notice of the qualified disciple of Æsculapius, and spreads from him to his fellows, finally to be incorporated in the armoury of the craft. Many are the nostrums of marvellous reputed power which are swallowed by our trusting fellow-creatures on the faith of tradition, and as yet are not found on the shelves of chemists. Nettle tea is a sample of this class. The advancing knowledge of the present day has introduced to us drugs the effects of which on the living body are accurately known by experiment; drugs which may be relied on to produce certain definite results, such as increasing or diminishing the rapidity of the pulse, dilating or contracting the pupil, inducing or checking perspiration, &c. It is obvious that these are most valuable tools in the hands of the doctor who is endeavouring to set in order our diseased bodies. And although many are the medicaments employed the exact *modus operandi* of which is but imperfectly understood, there are still some whose value has been ascertained as the result of scientific investigation, and the why and wherefore of whose actions is pretty completely accepted.

Among the methods of treatment which have pure empiricism for their origin, "bone setting," so called, occupies a prominent place. Without robbing the bone setters of all the credit they justly deserve in effecting many undoubted cures in cases which have been given up by the surgeons, they nevertheless are distinctly quacks, though having introduced a method of relief and cure which is gradually becoming accepted to a very considerable extent by the legitimate practiser of the healing art. No one attempts to deny that many a crippled limb pronounced to be incurable has been restored to a condition of perfect health by the treatment of bone setters; the cases are too numerous and too well attested to be doubted for a moment. But when the individuals who have effected these cures are confessedly ignorant of the structure of the limbs they are treating, who persistently designate every case they are called to as "a joint out," when such is rarely, if ever, the case, and who are really absolutely unaware of what it is they have done, even in their most successful cases, they are worthy of no other title than that we have applied to them. For many a day there has scarcely been a district that has not had a "bone setter" who not unfrequently has combined this profession with some other calling, such as a blacksmith, and marvellous are the tales of their powers when all other means have been tried in vain. The fact that they frequently fail, as fail they do, and that, too, in cases which, did they possess real knowledge, they would see to be hopeless, should not

deter us from appreciating what is valuable in their system, and appropriating it. There are few methods, however wrong, from which some useful hint may not be obtained, for the wrong in many a method lies in the too absolute pursuit of it. For the proper application of a system which has its origin grounded in empiricism, an educated intelligence is required to avoid such mistakes as might overshadow the good that the system really possesses.

It is possible from one point of view that the very ignorance of the practisers of bone setting has been one means of contributing to the success it undoubtedly has gained. Wholly unaware of what they were really doing, they, blindly rushing in where the more knowing would have feared to tread, have succeeded, by the application of the powerful means which were necessary, but which the more cautious would have hesitated to employ, and so would have failed.

It is true, however, that such practitioners as the late Mr. Hutton had some knowledge to proceed upon, and some system upon which they acted; but knowledge and system alike were merely the outcome of having seen a vast number of cases, and having carefully noticed the result in each—an excellent plan when based upon a definite acquaintance with anatomy. This experience led them to decline cases which they felt to be unfavourable, though not knowing why, and gradually reduced their method of action within the limits of rules.

The term “bone setting” in itself is distinctly a misnomer. Scarcely ever have broken limbs come under this method of treatment, and when they have the results have been disastrous. A bone is said to be set when it is placed in such a position as to allow the fractured ends to unite. Bones that are ill set are sometimes purposely broken by the surgeon and re-set more favourably; such cases, however, the bone setter does not meddle with. What they really do is to restore the power of mobility in joints which have become stiff from accident or disease.

Not only is the expression “bone setting” incorrect, but their view of the condition they are called upon to treat is wrong. Nothing will persuade one of these bone setters but that the “joint is out,” and that what he does is to return it to its place. The remonstrances of the patient and his friends are alike unheeded, and the success that follows his treatment justifies—at least to his own mind—the view he has propounded. Now a broken bone is one thing, and a dislocated joint is another, and it is neither to set the one, nor reduce the other—to use the language of surgeons—that the bone setter is really ever called in.

In order to make clear to the reader what so-called “bone setting” is, we must explain the nature and structure of a joint. The rigid, unyielding bones, or the levers to which the muscles supplying the motive power of the limbs are attached, are enabled to move upon one another by certain arrangements, which are termed joints, similar to the hinges by which a door moves upon its post. Thus the forearm can be bent upon the arm at the elbow joint, the leg upon the thigh at the knee, the thigh upon the trunk at the hip, or the fist can be doubled by the folding of the different segments of the hand at the finger joints. The ends of the bones, where they come in contact at the joints, are covered by thin cushions of a firm yet very smooth substance, known as gristle or cartilage. Different joints are



of different shapes, but in all the bones which enter into the joints fit into one another to a certain extent, the inequalities at the end of one bone corresponding to prominences and depressions on the other. Sometimes the bones interlock very completely, in other cases the adjacent surfaces are nearly flat. The former variety, of which the elbow may be taken as an example, will obviously allow of more limited movement than the latter, as may be seen by contrasting the extensive range of motion possible at the shoulder joint with that at the elbow. It is further necessary to keep these ends of the bones in contact by some material which shall be sufficiently flexible to permit of the movement of the bones on each other, and at the same time shall not be elastic and allow the ends to be separated from one another. Such a material are the tendons constructed of, and they bear very much the same relation to the ends of the bones, surrounding them more or less completely, as the leather hinges do to a box and its lid. Round about the joint are the muscles and their tendons or leaders, by which they are attached to the bones. The tissue of which the tendons are formed is identical with that which forms the ligaments. Lastly, an arrangement exists in the joint for maintaining the surfaces of the cartilage lubricated by a viscid fluid, which acts like oil in a hinge. Such is the essential structure of a joint, however much they may vary in shape and size. In some few there are ligaments inside the joint, passing across from one bone to another; this is particularly the case in the knee. It should be understood that injuries to the joints, especially such as those leading to the escape of the lubricating fluid, are very liable to be attended with serious consequences.

Every one knows how easily and readily the healthy limbs move, and it will not be difficult to understand that anything which diminishes the flexibility of the tendons and ligaments, or causes the opposed surfaces of the cartilage to adhere together, will diminish the freedom of movement. Now it is exactly such conditions as these that accident or disease may lead to. We most of us, at some time or other of our lives, have unfortunately experienced a blow on a joint, or a sprain; the knee may have been struck with a cricket-ball; or the ankle may have been "twisted" by a fall. In the majority of such cases no harm follows, there is probably a good deal of pain, the joint is swollen and cannot be moved, and an enforced rest adds to the general discomfort. In a few days, however, the limb has returned to its normal state, and no harm has been done. Supposing, however, that the injury had been more severe, or that proper rest and other remedies had not been adopted, or that the individual's constitution had been such as to predispose him against recovery, the joint would then have become inflamed, and the ultimate result of such a condition would very probably be the formation of a certain material which would cause the surfaces of the cartilage to become adherent, and would render the ordinarily flexible ligaments firm and rigid, a state of things that we have seen interferes with the mobility of the joint. Rest, whether simply by keeping the limb quiet, or, as it is more completely obtained, by bandaging the limb in a splint, is a necessity for the treatment of the case; but this very rest, if unduly prolonged, is apt to favour the development of the "adhesions," as they are called, that have resulted from the inflammation, and allow of them becoming tough fibrous bands, which, if once formed, are rarely, if ever, to be got rid of. It is clear, however,

if these bands are broken across, or if the rigid ligaments which impede the movements of the bone be bent and made pliable, that a considerable, or perhaps complete, improvement may be effected. It would seem that the actual significance of a stiff joint has not hitherto received quite all the attention it has deserved, and that possibly the notion of resting a limb has been pushed too far. Be this as it may, what the bone setter does is forcibly to flex the affected joint, and in so doing rupture the adhesions and bend the ligaments, leaving the ends of the bone free to move upon one another. With the knowledge of how serious joint affections may be the surgeon may have hesitated to apply sufficient force to affect his object, and only succeeds in causing pain, whilst the more ignorant "bone setter" who follows him, heedless of what may be since he knows it not, puts the whole strength of his arm into his work, and breaking through all obstacles, not unfrequently brings about a perfect cure at once, and points to the cracking that is heard as the restraining bands give as the proof of his assertion that the "joint was out," and has now "gone back to its place."

It would not be quite fair, however, to the bone setters to attribute their success simply to ill-considered efforts of brute force. The more successful among them—and notably Mr. Hutton, before mentioned—had reduced the method of procedure to rules, the results of extensive experience. When once a case is undertaken—and it is by no means every one that presents itself that is accepted—a definite mode of action is determined on, and either put in practice then and there, or after a slight preliminary delay, during which the affected part is usually ordered to be poulticed and rubbed with oil, ostensibly for the purpose of softening and rendering more pliant the structures round about the joint. When the operation itself is performed, there is no more done than is actually necessary. The limb is bent and straightened by a few effective movements, not one beyond what is needful. According to the joint which is to be manipulated, and the supposed direction in which the "bone is out," so are the movements made; but considerable importance is attached to making them in the direction in which the most pain is produced, and at the same time it is regarded as essential that a painful spot, which is almost always to be found somewhere over these joints, should be firmly pressed upon by the thumb of one hand of the operator. One great advantage is the absence of apparatus and instruments, often so terrifying to patients. The limb is held firmly on the side of the joint next to the trunk, and the required movements are made by bending and twisting in definite directions the segment of the limb beyond the seat of the mischief. Advantage is often very cleverly taken of the natural leverage afforded by the bones and the weight of the trunk, and this without any real knowledge on the part of the manipulator of the actual arrangement of the bones and muscles, but simply as the result of experience.

Whilst it is plain that in cases such as we have described a plan of treatment like this appears to be rational, and is, as we know, often successful, it is equally obvious that there might be many diseases of the joints which would be made very much worse by such a course. For instance, the cartilaginous ends of the bone not unfrequently become destroyed as the result of disease; or matter may form in the joints, and break through to the surface. This is especially liable to co-exist



with the death of a portion of the bone. In all such cases the bone setter, if he touched them at all, would assuredly aggravate the disease, and death has been known to follow their interference. And it is at this point that the skilled surgeon has the advantage over his empiric rival. The knowledge of anatomy and of the true condition of the parts, together with a general acquaintance with the signs and symptoms of disease, would lead the former to recognise at once the suitable from the unsuitable, and to know when he might with propriety act. With the other it is often but little more than guessing, and sometimes he guesses wrongly. Enough will have been said to show the real value of so-called "bone setting," and that whatever may have been its results in the hands of its practisers, it is destined to become in the hands of the intelligent surgeon a valuable addition to his means of combating disease. Accepting from the quack the general principles of his art, it is amplified and corrected by the light of knowledge, and the how to act is improved as the when to act is accurately ascertained. There should be no need to caution the public at large against attempting the process themselves.

In connection with the subject of "bone setting," a word or two may be said on the treatment of deformities. In the majority of these cases, domestic medicine is obviously powerless. The wisest course is to lay the matter before your ordinary medical attendant, and to take his advice about consulting a specialist or expert. In deformities of the limbs resulting from rickets much, however, may be done without resorting to mechanical appliances or instrumental aid. It is a great mistake to be in a hurry to put children into irons. Many people have a mania for these horrors. Often enough, it is true, the legs become straight when these instruments of torture are worn; but, in the majority of cases, they would get all right just as quickly without them. We are often told that a child "gives way at the ankles." This simply means that the bones are not yet sufficiently strong to support the weight of the body, and the rational treatment is obviously to keep the child off its legs till they grow stronger. A little persuasion will, as a rule, be found more efficacious than a bar of iron. Let the child crawl, by all means; but keep him from standing or walking. The only kind of splint that is likely to do any good is a long, wooden, padded splint, placed on the outer side of the limb, reaching from above the knee to well below the foot, and this acts simply by preventing the child from using its feet. The same result may often be attained by tying the legs together just above the knees. Attention to the general health will in these cases do more good than anything. The child should be placed in as favourable hygienic conditions as possible, special attention being paid to the purity of the air, warmth of clothing, &c. It should, if possible, sleep alone, and care should be taken to keep the bed and bed-clothes fresh and sweet. Milk should enter largely into the composition of the diet, two or three pints, either pure or diluted with water—or, better still, lime-water—being taken in the course of the day. Steel wine is a useful adjunct, and the same may be said of Parrish's chemical food, and the syrup of phosphate of iron. Cod-liver oil, given immediately after meals in a little orange wine, often proves remarkably beneficial. The phosphate of lime powders (Pr. 77) will do much to give the requisite firmness to the bones.

## MASSAGE AND OTHER FORMS OF TREATMENT

MASSAGE, as a mode of treatment, has of late attracted considerable attention both in England and on the Continent. It is by no means a new method, for in a crude and superficial form it has been known from the earliest ages. It was familiar to the Romans, and, under the name of "*lomi-lomi*," is frequently resorted to by the Sandwich Islanders. There is an admirable account of its history in the *Nineteenth Century* for December, 1886, which may be consulted with advantage. It is from the pen of Lady John Manners, and is derived chiefly from the works of German writers. Massage differs entirely from "shampooing" and the so-called "medical rubbing," and will often effect a cure after these procedures have been resorted to in vain. It may be defined as a scientific method of treating disease by systematic manipulations. For its proper performance a good knowledge of anatomy and physiology is essential, and it is not an art to be acquired in a few weeks or months. In some countries it is taught thoroughly by lectures and demonstrations, the course extending over a period of five years, no one being permitted to undertake a case, even under the direction of a doctor, until every branch of the subject has been thoroughly studied. Massage was first employed scientifically by the celebrated Dr. Mezger, of Amsterdam, and its mode of action has been experimentally investigated by Billroth, Esmarch, Langenbeck, Von Mosengeil, and some of the first physicians and surgeons of the Continent. It has also been employed in a modified form in America, although the methods there pursued are not identical with those resorted to by Mezger. For many years patients were sent abroad in order to obtain the requisite treatment—the course usually extending over a period of six weeks—but now it can be obtained in London, and patients are not compelled to undertake long journeys in search of restoration to health and vigour.

The terms originally employed to denote the various procedures which together constitute what we call *massage* are of French origin, and although they may at first seem unfamiliar to us, it must be remembered that they have now an established usage and a definite meaning, for which it would be difficult to find other adequate equivalents. It must be remembered, too, that whilst massage always consists of manipulations, all manipulations do not constitute massage. Massage may be regarded as a general term which includes a number of specific forms or varieties. One of the procedures most frequently resorted to is called *effleurage*. In the performance of this manœuvre the hands are moved rapidly upwards from the extremities towards the centre of the body, so as to stimulate the muscles to contract and facilitate the circulation of the blood. If the process were applied merely to the surface of the skin it would do little or no good, and it is requisite that the operator should have a knowledge of the position and course of the various muscles and groups of muscles in order to stimulate them to



action in a certain definite order. This method is of little value when used alone, and should always be combined with what is called *pétrissage*. In the processes of *pétrissage* the muscles and other tissues are firmly grasped with both hands, so as to stimulate the deep muscles to action and set free morbid products, which are then carried away by the small blood-vessels and lymphatics into the general circulation. It is obvious that this differs essentially from ordinary medical rubbing, every movement being performed with a certain definite object. *Tapotement*, another variety of massage, consists in striking lightly and rapidly with the tips of the fingers the "motor points," or spots at which the nerves supplying the various muscles become superficial and can be reached from the surface. Instruments for performing this operation are sold, but they are of no use in unskilled hands, and would no more enable one to perform massage without the requisite knowledge than would the purchase of an amputating knife qualify its possessor for cutting off a leg.

We usually speak of a man who has a competent knowledge of massage as a *masseur*, whilst the term *masseuse* is employed when the operator is of the female sex. These terms, however, are frequently misused, and now-a-days every sham-poor who has had a few weeks' practice in a Turkish bath calls himself a *masseur*, and speaks as if he were an authority on the subject. Massage, when properly performed, is by no means disagreeable to the patient, and even young children look forward to the daily visit with feelings of pleasure. It must be remembered that massage, like many medicines, is a powerful remedy—capable of doing harm as well as good. It should never be resorted to merely for amusement, or without the advice of a doctor who has studied the subject. At one time many medical men were prejudiced against its employment, preferring to trust entirely to old-fashioned remedies for the cure of their patients; but, now that its mode of action is understood, they are usually amongst the first to recommend it. For obvious reasons it is desirable that ladies and children should be treated only by a *masseuse*, and not by a man-rubber. It is usually recommended that the sitting should last only a few minutes, and this is the rule on the Continent; but Mrs. Camillo-Soutten, as the result of much practical experience, points out that better results are often obtained when the *séance* is prolonged for half an hour. It is essential to have one day's rest a week, and the operator should never be permitted to pay her visits on Sunday. Care, too, must be taken not to over-fatigue the patient, or harm may be done instead of good. In addition to being thoroughly trained and educated, the *masseuse* must be in perfect health, and should never be overworked. People who suffer from any constitutional complaint or infirmity, especially skin eruptions, should never be employed. As much care should be taken in the selection of the operator as doctors usually display in choosing a wet nurse for an infant. Nurses who, from time to time, may be called on to undertake surgical cases, or the care of patients suffering from infectious diseases, are, even apart from the absence of proper training, unsuited for the work. It is often supposed that handsome incomes are realised by treating patients by massage, but it is hardly probable that this is the case; and, taking into consideration the difficulty with which a knowledge of the art is acquired, and the initial expense, it is doubtful if it

is equal from a pecuniary point of view to many other callings which are open both to men and women. Skilled performers can, of course, command high fees, but this is true of almost every profession. The work is laborious, and many people are quite unfitted for it.

There are many diseases which are well adapted for treatment by massage, but, on the other hand, there are many to which it is wholly inapplicable, and which would be more successfully treated by ordinary medicinal means. Cases have been known where massage in injudicious hands has caused much mischief, and has even given rise to fatal results. A gentleman died from an aneurism of the chest, which was ruptured by the manipulations of an over-zealous rubber, the patient falling back dead on his couch. In several other instances people have died in a similar way from perforation of the stomach. Even when applied to the limbs it is not always safe, for, when the blood-vessels are hard, or have undergone degeneration, they are easily fractured. In the case of young and delicate children the bones are soft, so that it is impossible to be too careful in resorting to these procedures.

The most striking cures by massage are effected in certain cases of paralysis, although it is not every form of paralysis which is benefited by the treatment. In the paralysis of children—or infantile paralysis as it is called—a cure may nearly always be effected, provided the treatment be commenced before the disease has progressed too far. Murrell, in his work on “Massage,” speaks strongly of the beneficial effects he has observed, and other medical writers have recorded equally good results. In the hysterical paralysis which affects ladies, a cure may follow even a few applications. There is probably no condition more speedily alleviated by this means than chronic constipation. This, as we all know, is an obstinate complaint, and patients frequently take purgatives and other remedies until they despair of ever obtaining even temporary relief. Massage of the abdomen performed over the course of the large intestine, will usually ensure a prompt and easy action of the bowels, the relief in many instances being almost immediate. The forms of massage resorted to in these cases are *effleurage* and *pétrissage*, combined with *tapotement*. For many kinds of dyspepsia, especially when associated with persistent lowness of spirits, this combination forms an excellent mode of treatment. In many liver complaints, too, it is useful, the pressure over the organ stimulating the secretion and flow of bile. In the treatment of sprains and other affections of the joints, massage is of much value. In these cases we usually resort to what is called *massage à frictions*, performed with the tips of the fingers moving in a circular direction over the painful part, so as to empty the superficial blood-vessels and relieve congestion. In a great many affections of the nervous system massage is now the recognised mode of treatment. It speedily cures children suffering from St. Vitus’s dance, even when the complaint is of long standing.

For spinal irritation—one of the chief symptoms of which is a burning pain in the back, between the shoulders, excited by the slightest exertion—massage is strongly recommended, and equally good results follow its employment in “nervous exhaustion,” from which both men and women so frequently suffer. In spasmodic affections of the muscles, due to overwork, it may always be employed with confidence, and



by its aid it is often found possible to cure writer's cramp, dancer's cramp, and the cramp from which pianoforte players, violinists, and others engaged in the performance of delicate and intricate movements so frequently suffer. Rest in these cases is usually essential, and it is often weeks or months before the sufferer can resume work with comfort or even safety.

Massage is useful in many constitutional diseases, such as anæmia, or poorness of the blood with deficient nutrition. When the body is badly nourished the patient often gains weight, the powers of assimilating food and nourishment being improved in a very remarkable way. On the other hand, when the tissues are flabby and the patient suffers from excessive corpulence, massage causes a loss of weight, the unhealthy tissues being absorbed and replaced by good solid muscle. Massage is useful in chronic gout and rheumatism, and also in chronic lead poisoning. In diseases of the heart it is, as a rule, inadmissible, but in certain forms associated with dropsy it often does good, as pointed out by Dr. Murrell, by improving the circulation and promoting absorption. It is frequently resorted to in various uterine affections, and is said to be especially indicated when patients suffer from a condition of chronic tiredness and inability for exertion. It will often afford relief in diseases which are commonly regarded as incurable.

*The Weir Mitchell Treatment.*—This mode of treating certain cases of hysteria was originally introduced by Dr. Weir Mitchell, of Philadelphia, and consists of a combination of seclusion or isolation, over-feeding, electricity, and rubbing. It is sometimes called the massage treatment, but it has nothing to do with massage proper; with massage, that is to say, as it is practised on the Continent of Europe. The patients are strictly confined to bed, not being allowed to move even for the most necessary purpose, and are rubbed vigorously all over twice a day, food being abundantly administered in the intervals. In some cases the results are most satisfactory, whilst in others the patient derives comparatively little benefit. The class of cases to which it is applicable are perhaps more common in America than in England. It is usually carried out in some "home" or "establishment," and the expense incurred is frequently considerable. There is no reason, however, why this should be the case, as skilled labour is not employed, and the requisite instruction in the various manipulations is readily acquired. When the Weir Mitchell treatment is combined with real massage performed by a trained *masseur* or *masseuse*, the results are much more satisfactory. It is not claimed for this method of treatment that it is adapted for paralysis, but simply that it is useful in certain hysterical affections.

*The Ling System.*—The Ling System, or Swedish movement cure, was named after Peter Hinrik Ling, the distinguished poet and physiologist, who in 1813 established an institution at Stockholm in order that he might practice and teach his system of gymnastics, which was described as equally adapted for the sick and the healthy. It includes "passive" movements executed by an external agent upon the patient, and "active" movements produced by the action of the voluntary muscles. The sufferer is usually instructed to carry out systematically certain definite exercises, and in this way the suppleness of stiff joints may sometimes be restored. There is no doubt that many people benefit much by this treatment, and

that for those of a sedentary habit it is useful. At the same time it must be admitted that in these cases equally good results are obtained from a course of cricket, boxing, lawn tennis, or even billiards. Great difficulty is always experienced in getting busy men and indolent women to take sufficient exercise, and anything that will accomplish this object, and maintain the health, may fairly be regarded as a hygienic or even curative agent. The Ling system is now less commonly employed than formerly, but it still has its advocates, especially on the Continent.

*The Zander System.*—The Zander System of Treatment was originated by Dr. G. Zander, of Stockholm, who invented a series of machines by which the various muscles, tendons, and ligaments of the body can in due sequence be brought into play. It is largely resorted to as a curative agent on the Continent of Europe, but in England seems to have met with comparatively little favour. There is a Zander Institute in London, and there are similar establishments in many large cities, containing between thirty and forty instruments to be worked by the patients themselves for “active” exercises, and about half that number worked by an engine for “passive” exercises. The machines are costly, and beyond the means of most patients to acquire for their own personal use. The class of diseases capable of being treated by this method is large, and the results obtained are often surprisingly good. Many people resort to the Zander Institutes for exercise, quite irrespective of any complaint from which they may be suffering, just as they would go to a gymnasium. It is to be regretted that this method of treatment is so much neglected, but, on the other hand, it must be confessed that unless the patient can afford to live near the establishment, considerable expense and loss of time must of necessity be incurred. It is possible that, as the treatment becomes more popular, other institutions will be opened, and that the sphere of usefulness of this remedial agent will be more accurately defined. It is undoubtedly of much value in the treatment of stiff joints, shrunken limbs, and other deformities.



## TABLE OF DOSES.

IN this table only medicines in common use are given. The doses are those ordinarily employed: in some cases it may be necessary to depart from the rule. Prescriptions for many of these drugs have already been given (*see* PRESCRIPTIONS). The doses are, in most cases, those suitable for adults. The proportionate dose to be used for children and young people is indicated below:—

Under 1 year old give $\frac{1}{12}$ of the adult dose.				
„	2	„	$\frac{1}{8}$	„
„	3	„	$\frac{1}{6}$	„
„	4	„	$\frac{1}{4}$	„
„	7	„	$\frac{1}{3}$	„
„	14	„	$\frac{1}{2}$	„
„	20	„	$\frac{2}{3}$	„
Above 21		„	full dose.	
„	65	„	the inverse gradation of the above.	

It should be borne in mind that certain drugs, especially opium and its preparations, must be given with great care to children.

Alum as an astringent, fifteen grains.

Antimony Wine:

As an emetic, a table-spoonful.

In fevers, five drops.

Barley water, *ad libitum*.

Baume de vie, two table-spoonfuls.

Black draught, two table-spoonfuls or more.

Brimstone and treacle, a tea-spoonful.

Bromide of potassium, fifteen grains.

Cajeput oil, three drops.

Calomel as a purgative, three grains.

Camphor julep, two table-spoonfuls.

Carbonate of magnesia, half a drachm.

Carbonate of potash, fifteen grains.

Carbonate of soda, fifteen grains.

Castor oil, a tea-spoonful to a table-spoonful.

Chalk mixture, two table-spoonfuls.

Chamomile tea, a wine-glassful.

Charcoal, a tea-spoonful.

Chloral, ten to fifteen grains.

Chloric ether, fifteen drops.

Chlorodyne, ten drops.

Citrate of iron and quinine, fifteen grains.

Cod-liver oil, a tea-spoonful to a table-spoonful.

Colchicum wine, fifteen drops.

Confection of senna, a tea-spoonful.

Confection of sulphur, a tea-spoonful.

Decoction of aloes, two table-spoonfuls.

Decoction of bark, two table-spoonfuls.

Decoction of broom-tops, two table-spoonfuls or more.

Decoction of dandelion, two table-spoonfuls or more.

Decoction of sarsaparilla, two table-spoonfuls or more.

Dover's powder, ten grains.

Dill water for children, a tea-spoonful.

Easton's syrup, a tea-spoonful.

Epsom salts, half a tea-spoonful.

Ergot, liquid extract of, fifteen drops.

Essence of anise, fifteen drops.

Essence of camphor, five drops.

Essence of ginger, fifteen drops.

Essence of peppermint, fifteen drops.

Friar's balsam, half a tea-spoonful.

Gallie acid, fifteen grains.

Gregory's powder, for children, ten grains.

Grey powder, five grains.

Infusion of calumba, two table-spoonfuls or more.

Infusion of cascarrilla, two table-spoonfuls or more.

Infusion of gentian (compound), two table-spoonfuls or more.

# TABLE OF DOSES.

Infusion of quassia, two table-spoonfuls or more.	Senna tea, half a cupful.
Infusion of orange-peel, two table-spoonfuls or more.	Spirits of camphor, twenty drops.
Iodide of potassium, five grains.	Spirits of chloroform, fifteen drops.
Ipecacuanha wine :	Spirits of horseradish, thirty drops.
As an emetic, a table-spoonful.	Spirits of juniper, a tea-spoonful.
For cough, ten drops.	Steel wine, for children a tea-spoonful.
Lavender, compound tincture of, a tea-spoonful.	Sweet spirits of nitre, half a tea-spoonful to a tea-spoonful.
Lime water, two table-spoonfuls or more.	Syrup of chloral, a tea-spoonful.
Liquorice powder (compound), 30 to 60 grains.	Syrup of poppies, for children half a tea-spoonful.
Mindererus's spirit, three tea-spoonfuls in water.	Syrup of senna, for children a tea-spoonful.
Mustard, as an emetic, a table-spoonful.	Tannic acid, fifteen grains.
Paregoric elixir, half a tea-spoonful.	Tar water, two table-spoonfuls or more.
Parrish's chemical food, a tea-spoonful.	Tincture of bark, a tea-spoonful.
Peppermint water, two table-spoonfuls.	Tincture of calumba, a tea-spoonful.
Pepsine, three to five grains.	Tincture of ginger, twenty drops.
Quinine wine, two table-spoonfuls.	Tincture of nux vomica, ten drops.
Sal volatile, twenty to thirty drops.	Tincture of quinine, a tea-spoonful.
	Tincture of steel, fifteen drops.



# THE LADIES' PHYSICIAN.



## CHAPTER I.

### PUBERTY.

Importance of—Age at which Menstruation first appears—Conditions which affect it—Climate—Race—Hereditary Tendencies—Social Position—Habitation—Change of Figure preceding the Appearance of Menstruation—Diet at this Period—Clothing—Exercise.

PUBERTY—the time of transition from girlhood to womanhood—forms one of the most important epochs in the life of the human female. It is a time when great demands are made upon the constitution, in consequence of the rapid development of the intellectual, the emotional, and the generative systems. It is one peculiarly liable to disturbance of the physiological processes which naturally go on in the body, and to attacks of disease. Marked care should be taken of the young girl at this period, with a view to favour the natural processes which are taking place, to ward off evil influences, and establish the general health as well as the functions of special organs. One of the most marked of the latter is the discharge, every month, of a sanguineous fluid from the generative organs—or menstruation. When this function is naturally and healthily established, it is generally and rightly considered that a great crisis has been passed. When, on the other hand, it is not established at the proper time, or but imperfectly, the condition of the young subject is regarded as one of anxiety. Every mother should be acquainted with the physiology of this subject and this period, in order that she may know what to expect, understand the meaning and value of certain peculiar symptoms which not unfrequently make their appearance at this epoch, recognise those of evil omen, and place her child in the most favourable conditions to pass through a time which must always be regarded as one of considerable anxiety in a favourable manner.

At this period, physical and moral care and education are of peculiar importance, for lack of either may result in disease, which can with difficulty be eradicated; while, on the other hand, both the mind and body are in such a plastic state that by proper treatment they can be moulded, in a great measure, according to desire.

The above observations are more or less true of infancy, childhood, and the whole period of growth and development, but they are especially true of the time when a function which is acted upon by, and reacts upon, all the other functions of the organism in such a marked and mysterious manner as the function of the organs of generation is being developed and established.

We will, therefore, in this chapter briefly describe the changes which take place

at this period, and point out the general home treatment that is likely to lead to a favourable issue.

*The Age at which Menstruation first appears.*—This varies considerably in different individuals. The average age, calculated from observations made in a very large number of cases, is in this country about the fifteenth year. It may, however, appear much earlier, and may be retarded to a much later age. Indeed, instances are known in which infants have suffered from a monthly discharge of sanguineous fluid from the genital organs, accompanied by all the symptoms of menstruation. On the other hand, cases are on record in which the appearance of the menstrual function has been delayed until after the thirtieth year. Both are, however, of great rarity, and should be regarded rather as curiosities than as normal evolutions. It is, at the same time, well to bear in mind the possibility of such occurrences, especially as mothers are liable to become over-anxious about a retarded puberty, and desirous to force the appearance of what the young girl is not yet prepared for. There are other rare cases in which menstruation never appears throughout life, or where it is established only after marriage or after pregnancy. The cases where the function is never performed are, probably, instances of deficient development, or absence of some of the organs of generation; while those in which it is established only after marriage are cases in which those organs have not attained full development before marriage was contracted.

There are several conditions which appear to exercise a marked influence on the time of the first appearance of this monthly flow. Amongst these the most important are climate, race, hereditary tendencies, social position, and town and country life.

*Climate.*—In our own climate there is, it is true, a great variation in the time of the appearance of the first flow in different women, but, as has been said, the average age is about the fifteenth year. In hot countries, as India, the average age is about thirteen; while in cold climates, as in the North of Europe, menstruation is not established until about the seventeenth year. Moreover, in hot climates girls pass into womanhood, and women become old, at an earlier period of life than those who dwell in colder climates.

*Race.*—Inasmuch as different races inhabit different climates, it is difficult to attach to race and climate the exact influence each exercises on the first appearance of the menstruation. Both usually act together, and the influence of each is in the same direction; yet it cannot be doubted that race plays a marked influence in determining the first performance of the function we are considering; for Englishwomen brought up in India menstruate for the first time about fifteen, while the Hindoo women are regular at the age of twelve or thirteen. Observations made in several nations prove the same thing; but none are more striking than the one just mentioned.

*Hereditary Tendencies.*—The females of some families menstruate early, while in those of other families the function is late in its appearance. Occasionally the daughter becomes regular for the first time at the same age that the menstruation first appeared in the mother. This may happen in two or three generations, though, owing to numerous causes, it occurs only rarely.



*Social Position* has a determining influence on the date of the first appearance of the catamenia, or menstruation. Girls of the higher classes of society, who lead luxurious, sedentary lives, whose diet is rich, stimulating, and abundant, are regular at a somewhat earlier age than those whose fare is scanty, who work hard, and are accustomed to muscular exercise, &c.

The last element which exerts an influence on the appearance of the monthly flow which we shall mention is *Habitation*. Those who live in large towns, and who are subject to the exciting influences of the social life of cities, menstruate earlier than women who live in the country.

All these conditions should be kept in mind when the time of puberty is approaching, so as to have some idea of the time when the appearance of the monthly flux may be expected, and to relieve any anxiety that may be felt on account of its precocity or retardation.

The quantity of the discharge varies much in different women, and consequently it is impossible to fix the exact amount proper to any individual subject. The personal experience of the female herself alone can do this. In some the flow is habitually scanty, lasting a day or two only; while in others it is profuse, lasting seven or eight days. In the great majority of cases, however, it lasts from three to five days. By the Mosaic law, five days was fixed as its duration. It is not improbable, however, that, owing to peculiarities of the race and the climate inhabited by them at the time the laws were given, its duration was somewhat more prolonged than it is usually in our country.

In many cases menstruation makes its appearance suddenly and unexpectedly, without any previous warning. In some cases accidents, falls, over-exertion, or horse-riding, may determine the first flux. A girl should always be forewarned against being frightened when this happens, by being duly and properly informed beforehand of the changes that are taking place in her system, and of what she may expect. This is the mother's duty; and the due performance of it may not unfrequently save from very serious consequences. It has happened that the flux has taken a girl unawares, that she has become frightened, thought herself injured, and bathed herself with cold water, checked the flow, and thus caused very serious illness. This is due only to gross negligence of duty on the part of those who have charge of her; for it should never be possible for her to find herself in such an unfortunate and cruel position.

Usually, however, Nature warns both mother and daughter of what is coming: changes that cannot be misinterpreted by the initiated take place in the organisation of the young girl, which point out that the period of transition to womanhood is approaching.

The form—no longer thin, angular, and clumsy—becomes plump, rounded, and graceful. The gait becomes firm and animated. The chest enlarges, the hips grow broader, the breasts develop and become full and round. The whole body, indeed, partakes in the process of development—the girl becomes a woman.

Besides interpreting the meaning of these changes to her daughter, a mother may do much to favour the normal performance of the function of menstruation, and to preserve and establish the health of her child at this critical period. Her

efforts should be directed to physical and moral training. With regard to the latter we shall say little or nothing, but the former falls in an especial manner within our province. And first of all of

*Food.*—The rapid growth of the body, the development of its various organs, and especially of the system of generation, demand an abundant supply of nourishing material. By this is not meant luxurious living; that would be productive of mischief. Besides laying the foundation for habits of indulgence and of ease, it has, as has already been mentioned, a tendency to bring about a too early advent of menstruation, before the system is properly prepared for the drain which that function entails, and before the organs concerned in its performance have attained the degree of maturity requisite for its healthy continuance. It is not luxurious living, then, but plain, wholesome nutritious food should be the fare of the young girl who is approaching the period of puberty: meat twice a day, plainly cooked, with vegetables, milk, and fruit puddings. Stimulants—even beer—are, as a rule, quite unnecessary.

*Clothing.*—Girls should be warmly clad from an early period. They should wear flannel next the skin, a flannel vest, and drawers drawn closely, but not tightly, round the leg, just below the knee. Warm clothing is particularly necessary when puberty appears: especially should exposure to severe cold when imperfectly clad be avoided during the menstrual epochs. Imprudence in this respect may be productive of severe mischief, as will be pointed out in the next chapter. It is better to wear flannel next the skin than to interpose linen between, because the former not only prevents the dispersion of the heat of the body, and so preserves the general warmth, but it also gently stimulates the cutaneous surface, favours the circulation as well as perspiration in it; and when, after exertion, while the skin is acting freely, exposure to cold becomes necessary, suppression of perspiration, together with the evils that may result from it, is far less likely to happen.

Stays are very generally worn, and there is no objection to their use, provided only they are properly made. Indeed, they may be of great service, in giving support to a feeble spine, and in helping the full expansion of the upper part of the chest. They should be made to fit the body, should not press on one part unduly, and, of course, should not be tight. It is hardly necessary here to refer to the evils of tight lacing; the fashion has, fortunately, long ago passed, and a very small waist is no longer regarded as elegant or natural to woman.

With regard to other clothing, it should vary according to the season of the year. During the hot days of summer errors are more likely to be committed than at other times, because of ignorance, or neglect of the difference in temperature in the day and in the evenings. This difference renders clothes which are ample during the heat of the day quite insufficient for the cool of the evening.

Whether stays be worn or not, clothes should not be tied too tightly round the waist. With a view to avoid the necessity of this, hooks should be fastened to the stays, in order to support the clothes and prevent them from slipping, and the tying should be sufficient only to retain them on these hooks. Whatever may be said in favour of the evening dress which is at present in use, it cannot be denied that exposure of so much of the upper part of the body is, in our climate, fraught



with great danger. Slight draughts in hot rooms frequently give rise to severe colds, and the ordinary evening dress is only too favourable to the effective action of such currents of cold air. In such circumstances great care should be taken to cover the shoulders after any exercise which heats the blood and causes free perspiration.

*Exercise.*—During the whole period of growth and development the young girl should take regular daily physical exercise. It favours the processes which go on in the body, facilitates nutritive changes, and renders regular and uniform the play of all the functions. Indeed, without exercise there cannot be health. All exercise at command should be undertaken—walking, riding, swimming, dancing. Walking is within the reach of all, and is sufficient to maintain robust health. It should not be taken immediately after a full meal, but in the morning or in the middle of the day, so as to have the combined effects of exercise, of good air, and the stimulating influence of the sun. Riding, when possible, is one of the best forms of physical exercise. It should not, however, be taken to the exclusion of walking.

Swimming is luxurious as well as bracing. The time that different persons can remain in the water with benefit varies much with the vigour of the constitution and the power of endurance. After being in the water for some time the body becomes colder, but this should not be allowed to be carried to any considerable extent; for the good effects of swimming depend not only upon the actual muscular effort made, but also on the reaction which should be established after leaving the water. If this reaction fails, swimming and all forms of bathing are injurious. The duration of the bath should be regulated so as to ensure such reaction. This varies much; and some persons may remain in the water for hours, others for minutes, while some can only take a single plunge. After bathing, the skin should be thoroughly dried and rubbed well with a rough towel, so that the whole surface becomes warm and red. Then a glow is felt all over the surface, and a pleasant feeling of lightness and activity. When this occurs, bathing does good; but when it fails, bathing should be given up.

Dancing is not only a graceful, but a most healthful exercise. It is, unfortunately, in this country associated with late hours, hot rooms, and bad hygienic conditions, and the evils resulting from these associations more than counterbalance the good derived from the exercise. For this reason we do not hesitate to condemn the practice of sending young girls to balls and parties, much as we would value dancing exercise when undertaken at proper hours, in the open air or well-ventilated rooms.

Nothing should be allowed to interfere with the regular sleep of young and growing girls; and exercise should be taken up to slight fatigue, for nothing is more favourable to healthy and peaceful sleep. Early hours should be observed, both in going to bed and in getting up; the air of a room is fresher and healthier in the morning, when they have been unoccupied for several hours, than in the evening, when they are hot and stuffy, from burning of gas, candles, or lamps, and from the products of respiration.

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## CHAPTER II.

## SYMPTOMS OF MENSTRUATION—DISORDERS OF MENSTRUATION.

Scantiness or Absence of—Causes of such Condition—Treatment—Suppression of Menstruation—  
Causes of — Consumption — Disease of Kidneys — Green Sickness and Pallor — Treatment—  
Hæmorrhage and other Discharges—Mental Emotion—Treatment.

WHEN a menstrual epoch is about to appear, certain symptoms make their appearance which indicate that the flow is coming. These vary in different women ; in some they are absent—there is no suffering of any kind, and the flow appears without their knowledge.

In the majority of cases, however, there is preceding suffering, and the subject is conscious of her condition two or three days before the appearance of the flux. These symptoms consist in a general aching, languor, a feeling of unfitness for work ; there is often headache, and a dark ring round the eyes, pain in the back and stomach and down the thighs. Occasionally there is sickness, a slight diarrhœa, and frequent desire to pass water. These are the symptoms which usually precede the flow ; they should not be severe, for when they suffice to lay the woman up they are due to a diseased and not a natural condition. In the next chapter these conditions will be discussed.

One of the first symptoms which usually attracts the attention of women to disorder or disease of the organs of generation is some abnormality in the performance of the monthly function called menstruation. This function is peculiar, so far as is at present known, to the human female. It consists in a discharge of blood and serum from the genital organs. It usually takes place every four weeks ; but in some cases this interval is shorter, while in others it is of longer duration. The function is first performed at about the age of twelve to fifteen ; it continues to be repeated every month up to the age of forty or forty-five. The process is of so striking a character, so entirely out of the common—indeed, unique—that it has attracted the attention of all people, both civilised and uncivilised. It is the process which marks woman as woman. When the discharge appears, and continues to be repeated without any irregularity or suffering, the girl has become a woman, and it may, with almost absolute certainty, be affirmed that the organs of generation are well formed and of a healthy character. This discharge, then, its appearance, its character, and the regularity of its performance, form a sort of index to the conditions of the pelvic organs, and any deviation from the healthy performance of the function points to something wrong in the general condition, or in the organs which are the source of the discharge. The aberrations in the performance of this function are of three kinds. The menstrual flow may be scanty or absent ; it may be profuse, or the bleeding may be repeated too often ; and the flow may be accompanied with intense pain. Any one of these conditions indicates that there is something wrong in the constitution itself or with the organs



of generation. Moreover, a very large number, indeed, the great majority, of the diseases to which the organs peculiar to the human female are liable, call forth or induce one or more of the functional deviations named, so that the importance of these symptoms (for they are not diseases) cannot be over-estimated; for they are the indicators—frequently the first, and sometimes the only ones—of the existence of constitutional or local disease. Further, inasmuch as in the great majority of cases the presence of one or more of the symptoms named are the troubles, *par excellence*, to which a woman is subject, and that during the interval between successive monthly flows she feels herself perfectly well, it becomes us, in a popular work of this kind, to classify diseases, which we shall discuss under the heads of prominent symptoms rather than according to pathological or scientific relations; because, in order to appreciate a classification based on the latter principles, a thorough scientific training is requisite, whereas such training may not be necessary for the appreciation of one based on the former. Indeed, in actual practice, the process by which a physician or surgeon frequently arrives at a conclusion with regard to the nature of a disease—and this is especially the case with him who treats the diseases peculiar to women—is by analysis—a tracing back of one or more prominent symptoms to their causes, the subordinate or less marked symptoms forming a series of finger-posts to direct him along the right track. We will then, first of all, enumerate and describe those diseases which give rise to the three leading and prominent symptoms named, viz., scanty or absent menstruation, excessive discharge, and painful discharge.

*Menstruation Absent or Scanty.*—This condition is technically or scientifically known as amenorrhœa. It is an affection of frequent occurrence. Its causes are numerous and various. It may, and frequently does, make its appearance at puberty. In that case the sanguineous monthly flow does not show itself at the usual age, and the girl, having passed the period of puberty, and the signs of puberty not having made their appearance, becomes the source of great anxiety to herself and to her parents. The causes of this condition are the following:—

1. Absence of the internal organs of generation or of some portion of them. The presence of some of these organs are absolutely essential for the discharge to take place. The source of the discharge is the body of the womb itself, or the uterus. The inner surface of that part of the organ becomes immensely congested, the vessels give way, and rupture and a flow of blood takes place from them. But the womb may be present and still the discharge may not appear. There are two small organs lodged in the pelvis, one on each side of the womb, called ovaries. These organs are the factories of the germs which, when fertilised and placed in favourable positions, develop and form a child. These organs also appear to have a very important part to play in the monthly function of the uterus, in the formation and flow of the menstrual discharge, so that their absence would entail absence of menstruation. Absence of the ovaries, then, is one cause of amenorrhœa.

This, however, is not of frequent occurrence: the ovaries are not often absent; more frequently they are somewhat smaller, less plump than natural—in fact, somewhat imperfectly developed. When these organs are wanting, the subject of the malformation is asexual. The external characters which accompany this

deformity are a general appearance resembling more that of the male than that of the female. The hips are less wide, the pelvis small, the breasts remain flat and undeveloped, the voice is harsh and manly. It is also said that hair grows on the face and chin like the beard of the male. There are present none of those symptoms which precede and accompany menstruation; the recurring headache, the pain in the back, the weight at the bottom of the stomach, the aching of the thighs, the general lassitude, and the dark areolæ round the eyes, are all wanting. Indeed, such a person presents to an observer but few of the peculiar characteristics of woman. The ovaries are lodged high up in the true pelvis, at the junction of the true with the false pelvis—a position which renders exploration of the organs during health impossible: so that it is not possible to recognise with absolute certainty absence of the ovaries; yet the general symptoms, positive and negative, go far to prove such absence, or, at least, complete inaction of the organs if they be present. Of course, nothing can be done to remedy such a malformation. At the same time, it should be borne in mind that though the person cannot become a mother, yet the general health is in no way affected by the deficiency, and that she cannot become the subject of many diseases to which well-formed women are liable.

2. Absence of the womb, or uterus. This is the organ which supplies, at the instigation of the ovary, the menstrual blood, and its presence is consequently essential to the performance of the menstrual function. It is also the organ which forms the nest in which the child, or embryo, is lodged and nourished before its birth; and, moreover, it is the active agent in the act of giving birth, for by the force of its powerfully contracting muscles is the child driven into the world. Entire absence of the uterus is very rare, but a rudimentary condition of the organ is less rare, though still not frequently met with. In persons in whom the womb is absent or rudimentary the menstrual flux is absent or scanty. The flow may take place without pain, but in many cases the pain accompanying the performance of the function is severe.

The general configuration of the body is womanly, the hips are broad, the pelvis large, the breasts round and well developed. The menstrual molimina, or the aches and lassitude which so often accompany menstruation, may be present, though more often absent. Treatment is vain when the uterus is absent; and when the organ is rudimentary, there are no means yet discovered by which its development can be ensured.

3. The menses may have not made their appearance by reason of an obstruction to their outflow. In such a case the uterus and ovaries are present and perform their functions; the menstrual discharge is poured into the cavity of the womb, but, owing to the occlusion of the outlet, remains dammed up in the cavity of the uterus or the canal of the vagina, or passage leading to the womb. The obstruction is most frequently met with at the mouth of the vagina. It is usually caused by an abnormal condition of a membranous fold placed in that situation and completely closing the passage. This fold of membrane—called the hymen—is a natural structure, forming a sort of imperfect valve to the vaginal orifice, but not completely closing that opening. Complete closure is a condition which, unless



remedied, may lead to very serious results. It causes no trouble or inconvenience, however, during infancy and childhood, not indeed until the advent of puberty, and not then unless the organs of generation become active and the menstrual secretion is formed. When the secretion of the menstrual flux begins, the troubles arising from closure of the vagina also begin. The discharge is secreted and poured out of the womb into the passage which leads outwards, in order to be separated and cast off from the body, but the orifice of the vagina, being completely closed by the hymen, prevents the escape of the discharge. In this manner it becomes lodged in the vagina. When the menstrual flow has ceased, but little discomfort, if any, will be felt during the first interval; but when the time of the next flow arrives the trouble returns. In this manner the discharge in the vagina accumulates and increases in quantity. As time wears on the pains preceding and accompanying menstruation—the *molimina*—increase in severity. They become more and more intense, and at last agonising. If carefully looked for a tumour or swelling may now be found in the bottom of the stomach. It is smooth, elastic, often very tender, the upper part is roundish; it rises from the pelvis, and has the shape and character of the uterus during the early months of pregnancy, and the girl may be unjustly charged with being in the family way. This tumour gradually increases in size every month. It should be noted that the increase always occurs at the times the pains are present—that is, at the times when the discharge is poured into the cavity of the uterus—and not during the interval. The pains in the stomach at last become prolonged and almost constant. The general health becomes deteriorated. The healthy and rosy-looking girl becomes sickly, pallid, and sallow. The appetite is lost, there is frequent vomiting, the bowels are confined, and there is constant urinary trouble.

The discovery of such a condition is of the greatest consequence. It should be done in order to save the innocent from foul and unjust aspersions. It should be done in order to relieve her from continual and agonising suffering. It should be done in order to save her life, for so long as it (the state) is permitted to continue, so long is the danger to life imminent. It has just been stated that life is endangered by this condition. This danger comes about in the following way:—The discharge, not finding an outlet, accumulates in the vagina, and distends that organ. When this distension has gone on to a certain degree, and still more fluid is poured into the cavity, the uterus begins to dilate, and this organ in its turn becomes distended; then the fallopian tubes, which lead from the womb to the cavity of the belly, become dilated, and the menstrual fluid may regurgitate along the dilated tubes into the abdominal or peritoneal cavity. This would give rise to an inflammation of a virulent and fatal character. The consequence would be certain death. But the fallopian tubes may not have been dilated. In that case the womb itself, by its over-violent contractions to get rid of its contents, which act as a foreign body, may give way by rupture, and the discharge escape, through the opening thus formed, into the peritoneal cavity—to give rise to intense pain and rapid death. Under such circumstances, interferences becomes absolutely necessary, with a view to avert ultimate death.

This condition requires considerable skill and knowledge for its discovery. An

examination of the parts and organs contained in the pelvis must be made before the state of things can be diagnosed. Digital and ocular examination of the external parts will discover the closure of the vagina and imperforate condition of the hymen. The finger cannot be introduced into the passage, and the eye cannot discover the fissure in the hymen. This, however, is not enough; it is further necessary to make out whether the uterus is present or absent; and if it be present, whether it is active in its functions, forcing out the menstrual fluid. A further examination is necessary for determining this point, and it is to be conducted through the bladder and the rectum; a sound, or catheter, should be introduced into the bladder, and the finger into the rectum. In this way a full and complete exploration should be made of the organs, of the thickness of the vagina, and of the contents of its canal, whether it is empty or whether it contains a quantity of pent-up fluid. Careful examination of the lower part of the abdomen above the pubes is necessary, and if a tumour be discovered in that situation its relation to the contents of the vagina should be made out. In this manner a skilled observer can readily recognise the condition, especially when he takes into consideration, in addition to what he observes for himself, the history which has already been told him. In addition to the above symptoms, in some cases the membrane closing the passage is greatly bulged out and thinner, and the dark sanguineous contents of the vagina may be distinguished through it. Such is the history and such the symptoms of this malformation of the hymen.

The obstruction to the flow may, however, be situated in other parts of the passage than the external orifice. The vagina itself may be entirely wanting. This is always a congenital defect, a malformation existing at birth. It is of rare occurrence. The vagina may be simply a stout thin pouch of varying length, but not reaching the womb. This is likewise a congenital malformation.

The canal of the vagina may be narrowed and completely closed in any part of its course. This condition may have existed at birth, or may be the result of inflammation acquired after that event. This is caused by wounds or tears of the wall of the canal, caused by severe labour or accidentally. Adhesions are formed by the pouring out of inflammatory products, and complete closure of the passage results.

The canal of the uterus itself is sometimes closed at its external orifice. This is, however, rare.

The symptoms in all these forms of obstruction are similar to those met with in imperforate hymen, and the method of examination already recommended for the discovery of the fault should be adopted.

The question now comes, What can be done to relieve these troubles and to cure the deformity? Can the condition be relieved and the patient cured without running any great risk? To this it is to be answered that in the case of imperforate hymen the condition can be readily enough relieved. An operation is required. The offending membrane should be incised or punctured. No operation could be simpler or easier of performance, yet it must be said that it is not free from danger—at least, in many cases. The fact is, that most of these



cases have been going on for a long time before they seek medical advice, and before any efficient means are taken for their cure. Perhaps in many cases medicines, baths, gin, whiskey, and the whole series of domestic medicines generally in use have been tried with a view to establish an impossibility—the bringing on of the flow when there is no outlet for it. These means, indeed, instead of relieving the condition, have greatly aggravated it, for they have doubtless increased the amount of the monthly flow, and in a proportionate degree the sufferings of the patient. When domestic knowledge and skill have been exhausted in vain, then the doctor's advice is sought. He discovers the condition, but only when the vagina and uterus have been for a long time distended and are in a very irritable condition. Under these circumstances an operation for the cure of the malformation is accompanied by great danger—far greater than when performed at an earlier period, before the organs have become so greatly altered in form and texture. The danger arises from the tendency of the womb to contract irregularly, and in this way to drive some of the fluid into the cavity of the peritoneum, thus giving rise to peritonitis.

But peritonitis, or inflammation of the belly, may arise also without regurgitation of fluid into the cavity simply as the result of the operation.

Operations for the relief of the other conditions causing obstruction to the menstrual flow are more complex and difficult. When the vagina is absent, or a considerable portion of it, the operation is by no means easy, and requires the greatest skill, knowledge, and patience on the part of the operator. The making of a new vagina, entirely or in part, is necessarily accompanied by some danger, but the danger is less than that arising from obstruction to the flow, which will in time necessarily prove fatal unless removed.

When the symptoms which usually precede and accompany menstruation have been present on two or three occasions, and the monthly flow still remains absent, the subject should be at once carefully examined. Should she then seek proper advice, the cause of the absence of the discharge would be found and removed before the fluid has accumulated behind the seat of obstruction and caused distension of the organs above and alterations in their tissues—conditions which not only endanger the life of the patients themselves, but also render the means of relief dangerous; whereas, were the operation performed at an early period of the menstrual life, it would entail little or no risk, and spare the patient much unnecessary and severe suffering.

Several other causes besides those mentioned may give rise to failure of the appearance of the menses at the proper time; among these no one is of greater importance than that condition known as anæmia and chlorosis, on account of its frequency. These as well as others will be discussed further on.

When menstruation has been regularly and properly established; when the flow has recurred every four weeks on several occasions, and then fails to return at the expected time, it is evident that there is something wrong with the general health or with the organs of generation, unless pregnancy be present. The causes of such cessation are numerous, and all different from those already mentioned. It is evident as the menstrual function has been regularly performed, that the organs of

generation are properly formed and fully developed—there is no deficiency in their size, and the passage cannot be obstructed.

One of the first symptoms of pregnancy is cessation or suspension of the menses ; and when in a married woman the catamenia do not appear at the expected time, she generally believes herself to be in the family way, and she is usually correct in her suspicions. At the same time, there are many other causes which may bring about suppression of the menses in those who have been already quite regular ; and this should not be forgotten, for should pregnancy be regarded as the only cause of suspension of the catamenia, many young girls would be unjustly accused or suspected without the slightest cause. These causes we will now proceed to enumerate, and we will at the same time give brief descriptions of the symptoms which usually follow or accompany their action.

Many general diseases give rise to suppression of the catamenia. For the healthy performance of the functions of any organ in the body sound general health is necessary. This is eminently the case with regard to the womb. Disorders of the womb itself give rise to innumerable general troubles, and many disorders of the general health give rise to suppression of the uterine functions. The diseases which cause these troubles are of a depressing and enfeebling character. They deteriorate the blood, partially arrest nutrition, cause wasting of the system, sometimes by some drain on the constitution, sometimes by their interference with the natural processes. Consumption is not unfrequently associated with amenorrhœa or menstrual suppression. Indeed, a suspension of the menstrual discharge is often one of the first symptoms of this insidious disease observed by the patient herself, and she goes or is taken by her friends to the doctor in order to “have them brought on.” She has not been regular for some time, and she as well as her friends regard this as the source of all the mischief—of all her symptoms. Of this she is so firmly convinced, that in all probability she has already tried all the means of which she has knowledge, in order to bring about their return, but happily in vain. Indeed, it is often difficult to persuade her and her friends that her symptoms are not due to the suppression of the menses, but to a much more serious condition, of which the suppression is the consequence. “I am sure,” she says, “if they were brought on I should be all right.” They have, according to her idea, run to her head or her chest ; whereas the real truth is, she is suffering from a severe disease of the lungs, of which she is quite unconscious, and the exhausting effects of this disease on her constitution it is which has caused the suspension of the menses. In such a case it would be very wrong to attempt to bring on the flow ; the constitution cannot afford the loss of so much blood ; it is required for other purposes. Indeed, in treating the case, no thought should be given to the amenorrhœa ; all the attention should be directed to the disease of the lungs, which is at the root of all her troubles. Nourishment, fresh air, oil, and iron, and change of air should be the means employed to counteract the mischief.

Another disease which is not rarely a cause of amenorrhœa is that disease of the kidneys known as Bright's disease. This is an affection which causes deterioration of the blood by causing a part of its albumen to pass out through the kidneys with the urine. It causes extreme pallor and dropsy. This form of suppression, like



the former, should be treated by attacking the disease of the kidneys, and improving the blood and the general health.

*Chlorosis, Chloranæmia, or Green Sickness.*—This is a disease very frequently associated with disorders of menstruation, and especially with suppression of the menses. It consists in a deficiency of red blood corpuscles and a watery condition of the blood. The blood is paler and less in quantity than it should be. It attacks young girls very frequently at the approach of puberty, and is often a most troublesome disease to cure, defying all efforts, and rendering all our skill vain. It sometimes comes on before puberty is established, and strong, lively, rosy, healthy girls become pale, sickly, dull, and feeble. In such cases the catamenia do not appear at the usual age, or only appear but very slightly. In other cases puberty has been attained and crowned by the regular and thorough establishment of the menstrual functions. The person has passed from girlhood to womanhood without a hitch; but soon after she begins to ail, she becomes a little paler, her appetite is fanciful. It is the beginning of anæmia, or perhaps green sickness.

The symptoms of the disease are pallor. In simple bloodlessness the pallor is of a transparent white; in green sickness there is a peculiar and often very striking greenish tinge with the pallor. The skin everywhere is pale, according to the degree of the disease. The lips are pale, sometimes almost white; the gums and mucous membranes of the mouth and eye are pale. The veins of the skin are bluish and not distended, for the actual quantity of blood is diminished. There is headache: this is almost constant pain in the temples and forehead. The patient is often giddy, and has noises in the ears. She complains of pain under the left breast, but she is not feverish. She has often pain along the spine, in the neck, between the shoulders, and in the loins. She complains of pain here and there of a neuralgic character. The appetite is very uncertain; there is often loss of appetite; in other cases the appetite is degraded, and the patient eats the most indigestible things: she eschews meat altogether, and eats pickles, fruits, bits of chalk, &c. The bowels are confined, often obstinately so, and greatly loaded. The stools are often offensive. The tongue is often furred, sometimes even covered with a thick brown fur. It is, however, often clean but pale. The breath is short; the patient is unable to go upstairs or up-hill, or to walk any distance for want of breath. The heart is in a very irritable condition; the least excitement or exertion will bring on palpitation, owing, probably, to the condition of the nervous system and the deficiency in the quality and quantity of the blood. The anæmic person is incapable and disinclined for any exertion; she likes to lie about or sit, does not care about going out, remains in the house, doing nothing but lounging about in a languid fashion. She is drowsy, heavy, and dull. She suffers from great lassitude; she is good for nothing; she is sometimes sick. Owing to the watery state of the blood, all the tissues are in a relaxed condition; nutrition is greatly impaired; the watery part of the blood oozes out of the vessels in the lax or depending part of the body, so that there is slight swelling of the ankles, sometimes of the eyelids. On listening to the heart and the great vessels of the neck, peculiar and characteristic sounds are heard, owing to the thin blood travelling along through the heart and vessels. This sound diminishes in loudness as the patient gets better of the disease, but often does not

disappear altogether, or, at least, it may be heard in a slight degree after the patient has gained her usual healthy colour.

This disease is brought on by depressing causes—causes which act unfavourably on the nutritive processes of the body and cause a deterioration in the quality of the vital fluid. Some of these causes are want of food, want of fresh air, bad food, bad air, sedentary occupation, living in warm, stuffy, ill-ventilated rooms, the inhalation of air contaminated with the poison of sewer gas, or other volatile poisons, overwork, &c. Sempstresses frequently are subject to this complaint; indeed, the conditions under which many of them live fulfil to perfection the demands for the production of this disease; but not only those who live in conditions unfavourable to health, but also those who possess every advantage and comfort may become the subjects of this affection. Without discoverable external cause, with good and plenty of food, with fresh air and change of air, with wealth and comfort, and all the necessities to ward off disease, a member of the family may become the subject of chloranæmia. In such a case the cause may be emotional, but it may be an inherent vice of the constitution. The patient has never been strong, has always been delicate, though never seemingly ill. Still, her constitution has never been robust; and towards puberty, when an extra demand is put upon it, it gives way, and the whole complex machine is thrown completely out of gear. The patient becomes chlorotic because the constitution does not possess sufficient vitality to carry on the nutritive processes with sufficient vigour to meet the increasing wants of the economy. The constitution is not equal to the demands of development and the duties of life. In such cases much may be done by external means and medical and moral treatment. By such means constitutions may be changed and completely altered—the weakly may be made strong, and the sickly healthy; and by such means may the chlorotic be sometimes cured.

When the disease has been thoroughly established, the difficulty of effecting a complete cure is very great. When it has been once apparently removed, it returns again and again; at the same time, by persevering in the use of proper medicines, proper hygienic and dietetic means, the disease may be removed and the patient effectually cured. These means require often to be used for a long time and continuously. Change of air is a very useful agent in the treatment; exercise in the open air is of the greatest importance. Exercise within doors will not do; the exhilarating influence of fresh air is necessary. Walking and riding are most useful, and better than carriage exercise. Change of dwelling is often useful. The place of abode may be too low, too damp, or in the neighbourhood of malaria; in such cases it should be changed, and a proper one selected. The food ought to be carefully chosen; no indigestible meat, vegetable, or pastry should be taken. Red meats are better than white; beef and mutton best. Red game may be taken. Fish should not be altogether eschewed, but should be taken sparingly. Good soups are useful, and beef tea above all of them. Milk is a most nutritious diet, and proves beneficial in chlorosis; milk puddings may be taken.

The medicines usually given are administered with the object of improving the condition of the blood, of increasing the number of its red corpuscles, its red colouring matter; with this view iron is given after food. One of the best forms of iron



is the steel wine, because it is easily digested and absorbed. There are other forms of iron which are of the greatest utility; for no single form of iron can be taken with benefit for a very prolonged period: the system appears to become accustomed to it, and after a time does not receive that benefit which is expected from it. When this happens, the preparation of iron should be changed; in this way the effects of iron on the system can be obtained for a long period continuously.

Other medicines are given with the same object, especially the preparations of arsenic and manganese, and in some cases where iron cannot be borne with great benefit.

The bowels should be kept regular. In these cases there is generally constipation, and in some cases obstinate constipation. The motions are often dark and offensive. The liver appears to be acting sluggishly; indeed, the functions of all the organs in the body seem to be less active than usual. In these circumstances a little blue pill at night to act on the liver, and a small dose of salts or a black draught in the morning, give great relief. They lighten the whole system, remove much of the drowsiness, and cause the patient to feel brighter and better. At other times a dose of Pullna water, Carlsbad salts, or Friedrichshall water, two or three times a week, taken in the morning, gives great relief, and keeps the bowels regular.

There are various watering-places, both in England and abroad, a season at which is productive of much benefit to chlorotic or anæmic persons. These places are those where there are two kinds of springs—a saline and a chalybeate. The saline should be taken in the morning on first going there until the bowels have been acted upon freely—it should in most instances be taken every morning for a few days or a week; and afterwards the chalybeate or iron water should be taken two or three times daily after meals, taking care to regulate the bowels by an occasional dose of saline. Iron is liable to cause headache when the bowels are confined, so that the importance of warding off constipation is great; for not only does it interfere with the proper absorption and action of the steel, but it also causes very severe suffering. The chief places where saline and chalybeate springs are found are Cheltenham, Leamington, Scarborough, Carlsbad, Ems, Franzensbad, Homburg, Pyrmont, Schwalbach, and Spa.

Baths are very useful in the treatment of the affection we are now discussing. The action of the skin should be excited. The bath should be taken cold every morning; the patient should remain in the water for at most a minute, and if she does not become warm and feel a glow all over soon after she has come out of the bath, she should only plunge into it, and be then thoroughly well rubbed with a rough towel until she is dry and warm: this should be done always after a cold bath. It makes the skin red, gives a glow over the whole body, makes the person feel warm—causes, in fact, a healthy reaction. Baths do harm when such reaction is not excited after them.

The patient should have mental occupation given her, for she will find none herself. It should not be of a severe or exhausting character, but light and amusing. It should be just enough to occupy the mind without wearing it. It should be alternated with amusements, change of scene, and all the little things

that contribute to make life happy and bright. Depressing influences should be altogether avoided.

No attempt should be made directly to bring back the menses. The treatment must be directed entirely against the general disease. The absence of the flowers is only a symptom of the general condition under which the whole frame labours, and of the influence of which every organ in the body partakes. When this general condition is cured and the disease removed, the symptoms will disappear, and the menses will return and become regular; when, however, this object has been attained, great care will be required to prevent a return of the affection, and a careful watch should be kept on the sufferer, in order to ward off the earliest symptoms of such return.

Again, all diseases which affect nutrition of the body in an unfavourable manner, or cause a constant and profuse drain upon the constitution, may bring about suppression of the menses. Among these may first be mentioned hæmorrhage. Hæmorrhage, in the first instance, causes an actual diminution in the amount of blood in the system, and, at the same time, brings about necessarily a deterioration in its quality—in fact, it causes anæmia; and while this state lasts, and even for some time longer, the menses may not appear.

Long-continued and profuse discharges from any part of the body, such as a chronic discharge of matter from an ulcer, or from an abscess, or from a diseased bone, or an exhausting white or yellow discharge from the womb or vagina, may, by lowering the system, in time bring about amenorrhœa.

Mental disturbance, anxiety of mind, strong emotions of pleasure or of pain, joy, grief, and sudden fright, may cause a similar condition. This is not to be surprised at. The influence of the mind on the body, and on the processes, whether healthy or diseased, which take place in it, is very marked. Emotions will arrest digestion, in some cases give rise to diarrhœa, in others constipation. They often increase the secretion of the kidneys, and sometimes cause a constant desire to pass water. Thoughts of unpleasant things are often most effectual emetics—they cause the stomach to expel its contents in a most sudden manner. The secretions of the stomach and of other organs may be instantaneously and entirely suppressed by a strong emotion. In other cases emotions cause a great increase in the secretion of organs, as that of the lachrymal or tear-forming gland and the kidneys. It cannot be wondered at that the womb—an organ that is in such intimate sympathy with the other organs of the body—is subject to similar influences, and that emotions may bring about total suppression of the monthly functions of the others, and that it may also, as will be pointed out later, give rise to an increase of the secretion, and to a profuse flow of menstrual fluid.

Disease of the ovaries is also a cause of amenorrhœa. The exact relation between the ovaries and uterus is not known. What influence the former exert over the latter is somewhat uncertain; it was at one time believed, and indeed is still by a great majority of physiologists, that the ovary is the prime mover in the performance of the monthly functions of the generative organs. This has lately, however, been called in question, and it has been maintained that the womb performs its part of those functions quite independently of any ovarian influence.



Whether this be the case or not, it is certain that the ovaries play a very important part in the life and in the formation of the physical and moral character of woman, and when the ovaries are removed by artificial means, or an operation, or by disease, a great change takes place in the subject of such deformity, and one of these changes is suppression of the menstrual discharge. It is stated that this does not occur in all cases, yet the exceptions are so few as not to invalidate the rule. The suppression may take place at the time when the ovarian disease sets in, or may come in after it has progressed some time and involved the structure of both ovaries.

Inflammation in and around the uterus is another cause of menstrual suppression. By this process the ovaries become bound down by artificial bands of membrane, and their activity may become entirely destroyed, and the menses then cease to appear. Tumours of the uterus occasionally bring about a similar suppression.

The *treatment* of these various forms of suppression of the menses varies according to their cause.

Hæmorrhages should be stopped; whatever be their source, this should be our first object. When this object has been attained, the next step in the treatment is to supply the place of the lost blood—to increase the quantity and improve the quality of the vital fluid. The means for effecting this are those for the improvement of the general health—a nutritious, healthy, easily-digested diet; beef tea, milk, red meats, fresh air. A small quantity of wine may be useful if the digestion be feeble.

Profuse and exhausting discharges, chronic abscesses, or ulcers, should be made to heal as rapidly as possible, by appropriate surgical means, and the means already pointed out for the improvement of the general health.

Discharges from the womb and generative passages should be treated by means of injections. Injections of warm water for the sake of cleanliness, and of astringents, as oak-bark, tannin, alum, or sulphate of zinc, for cure. General treatment in their cure is of the greatest importance. The bowels should be regulated, the digestion seen to, the diet should be good. In spite of all these means, such a discharge may persist. Then further treatment of the inner surface of the womb will become necessary.

A suppression arising from mental anxiety, exposure to cold, &c., requires very careful treatment. It is in these cases that attempts should be made to act directly on the womb; at the same time, violent remedies should not be carelessly taken with that object. It not unfrequently happens that with the suppression the general health is disordered. In such cases the general condition should be attended to first. If there should be indigestion, it should be cured. If there be constipation, it should be removed. If the liver act sluggishly, small doses of blue pill may be given. Should the general health be good, attention may be directed to the organs of generation themselves, and medicines administered and means employed directly to bring on the flow. The medicines used for this purpose are mild purgatives—a pill of aloes and myrrh, or aloes and iron, or brisk doses of mercury; iodide of iron has also been given

with benefit. Oil of savin, ergot of rye, and cantharides are remedies which are believed to act directly upon the uterus, and to have the power of bringing on the flow when suspended; but their action is such that they require the most careful handling, and that they should never be taken except under medical advice. Beside remedies given internally, there are external applications which, when properly used, are of great service in the treatment of this form of amenorrhœa. They are the hot hip bath, placing the feet in hot water, or in hot water containing mustard, large linseed poultices to the abdomen, or a bag of hot salt, sitting over hot water and injections of warm water into the vagina, stimulating liniments to the abdomen and thighs, dry cupping of the thighs, leeches to the womb, the inside of the thighs, or the perinæum. All these remedies are in their turn useful, but each one of them may fail to bring about the desired result; then recourse must be had to other means, or to a combination of two or more of the above at the same time.

Electricity has also been recommended. This is a very powerful agent, both for good and evil. It is a powerful stimulant and anodyne; it is also a powerful destroyer and depressor. It may be applied externally; but when so used it frequently proves of no avail. Instruments have been made to wear in the womb; when placed there they generate a feeble current of electricity, and they are said to have proved effectual in procuring the return of the catamenia in some obstinate cases of amenorrhœa. They are not free from very serious danger.

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### CHAPTER III.

#### DISORDERS OF MENSTRUATION (*continued*).

Flooding, or Menorrhagia, Causes of—Fibroid Tumours of the Womb—Polypus of the Womb—Cancer of the Uterus—Ulceration of the Womb—Subinvolution—Good Effects of Nursing—Evil Effects of Over-nursing—Inflammation of the Womb—Inversion of the Womb—Hæmorrhage into the Tissues in the Neighbourhood of the Womb.

BLEEDING from different parts or organs of the body is of frequent occurrence. Bleeding from the lungs is not uncommonly met with, and then it is said that a "blood-vessel has been ruptured." It is of serious import, for as a rule it is the precursor of a very grave disease called consumption. Bleeding also takes place from the nose, especially in youth and early manhood. It is said that this form of hæmorrhage is not due to disease, but to rupture of the blood-vessels of the mucous membrane lining the nasal cavity, owing to their over-distension with blood. Hence it is said to be caused by blood plethora—an excess of blood in the system—and that Nature avoids more serious consequences by this simple expedient. Whether this be true or not, it cannot be questioned that in the adult woman—maid or mother—who has attained full and perfect growth, a discharge of blood takes place periodically every four weeks in a healthy manner from the inner sur-



face of the womb. It is a curious fact that all the hæmorrhages above enumerated take place into tubes or cavities which communicate externally. Blood from the lungs is forced into the bronchial tubes, and is expectorated with the phlegm. Blood from the stomach is ejected by the mouth or expelled by the intestine. Similarly hæmorrhages from the nose and uterus are discharged into channels communicating with the exterior. Again, with the doubtful exception of the bleeding from the nose, all the above are the result of disease, but the bleeding from the uterus is the result of health. Though the womb is not peculiar in pouring out blood on its inner surface, yet it is peculiar in the fact that it pours it periodically; that the bleeding is repeated with regularity for a certain period of life; that such bleeding lasts a certain number of days, and does not, as a rule, exceed a certain quantity in any given case; that it does not occur in childhood and infancy nor in old age.

But the amount of the flow may be increased until it becomes profuse, or may even threaten life; or the bleeding may continue without intermission, or with but slight intermissions, from month to month; or the regularity of the return of the flow may be deranged, and a bleeding may come on at irregular intervals—at intervals much shorter than the typical four weeks.

These symptoms are generally and popularly known as “Flooding.” In scientific language, two words are used to denote these conditions, according as the bleeding takes place at a menstrual period, or at any time in the intermenstrual interval.

When the hæmorrhage occurs with the monthly flow, or when the menstrual flow is profuse and excessive, the term *menorrhagia* is used to denote it. When it occurs at any time during the interval between two successive monthly flows, it is called *metrorrhagia*.

Flooding may take place at almost any period of life. It sometimes takes place when menstruation occurs for the first time. It may come on, and indeed it is by no means uncommon, at the change of life—during what is called the “dodging-time.” It may appear at any time during these two periods, and may occur even in old age, when the monthly bleeding has entirely ceased for many years.

It is always due to disease, and the conditions that give rise to it are very numerous. Some of these are remediable, while others have hitherto resisted the influence of general and local interference, treatment by medicines, as well as operative procedures, while all cause great discomfort, and may prove, if allowed to proceed unattended to, of a grave nature; for frequent and excessive losses of blood must after a time tell upon the system, must undermine the constitution, and ruin the health.

The causes of flooding may be divided into local, or those due to the state of the pelvic organs; and constitutional, or those in which the whole system is more or less involved. We shall, first of all, describe the former, and shall limit ourselves at present to those that are found in the unimpregnated womb, reserving those which occur during pregnancy for future consideration.

*Fibroid Tumours.*—Fibroid tumours of the uterus are, after a certain age,

of exceedingly common occurrence. The fibroid is by far the most commonly met with of all tumours that affect the uterus; at the same time that it is the most frequently met with, it is also, fortunately, the most innocent in character. They are called "innocent growths," in contra-distinction to "malignant growths," or those of a cancerous nature. When they attack an organ or part, they have no tendency to repeat themselves in other parts or organs; at the same time, a large number of fibroid growths of various sizes may occupy the walls of one and the same uterus. Fibrous tumours may be present in the womb and give rise to no symptoms, cause no inconvenience, and interfere in no way with the duties of life. This, however, is far from being always the case. Indeed, in many cases, fibroid tumours are a source of great trouble, much anxiety, great inconvenience, and danger. They occasionally, but very rarely, prove fatal. They are met with at all ages after twenty. They are seldom seen before that age, are more common after thirty, and still more so after fifty. They probably begin to grow at the period during which a woman is regular—that is between fifteen and forty-five. At the same time, it is not proved that they may not originate after this age; it is certain that they continue to grow after this age in some cases. They grow in the womb itself—in the body and in the neck of this organ, more often in the former than the latter situation; in the fallopian tubes—round and broad ligaments which are attached to the border of the womb; they may also grow in the vagina, but this is not a common seat of fibroid tumours. They are composed of a substance or tissue similar to that which enters into the formation of the womb itself. They are like small local enlargements, or hypertrophies of the substance of the uterus, but that they are in some, though not in all, cases separated from the tissues of the womb surrounding them by a case or capsule of tough membrane. It appears, therefore, that they are—though their structure presents a character similar to that of the womb itself—new formations, new growths altogether foreign to the uterus. They are usually of a roundish form, but their shape may be modified by a variety of causes. Several may grow together and form in the aggregate one tumour. In this case the surface would be irregularly nodular, and the general shape would possibly be roundish or indeterminate. Or a single tumour may grow so large as to become pressed upon by the solid and resisting walls of the pelvis, or the bony ring forming the lower part of the skeleton of the trunk, and in this manner receive the impress of that ring.

They vary much in size. They may be as small as a hemp-seed, or they may attain such dimensions as to fill the belly, and weigh sixty or seventy pounds. Tumours of such an immense size are but rarely seen; but every size, from the smallest to the greatest, may be met with.

In the same womb there may be present one or several fibroid tumours. Sometimes the number present is very great; so great, indeed, that the tissue of the womb itself has almost entirely disappeared, its shape has become hardly recognisable, and but little is visible except a bunch of fibroids. More frequently there is one or, perhaps, two tumours in the uterus. They grow in the substance of the womb; in that of the upper part, or body, and in that of the lower part, or neck, of the uterus. They are seated more often in the former than in the latter position.



The position the tumour occupies in the uterine wall, with regard to its internal and external surfaces, is of great importance. Upon this depends very much the symptoms which are present and due to the tumour; upon this also depends, in a great degree, the method of treatment which should be adopted. There are three positions which a tumour may occupy in the wall of the uterus. It may be close to and beneath the inner or mucous surface—then it is called sub-mucous; it may hold a similar position with regard to the peritoneal or abdominal surface—then it is said to be sub-peritoneal; or it may occupy a place in the middle of the wall—and then it is said to be interstitial. A fibroid tumour of the womb always occupies one of these three situations.

The symptoms of these three varieties are somewhat different.

*The Sub-mucous* variety, whether small or large, is almost always accompanied by symptoms of a more or less severe character. When even of inconsiderable size, they are accompanied by profuse menstruation, hæmorrhage, and pain. They also give rise, not unfrequently, to a profuse yellow or white discharge—the whites.

*The Interstitial* and *Sub-peritoneal* forms, when of small size, may give rise to no symptoms, and the discovery of their presence is often a matter of accident. As the tumours grow in size, symptoms appear. These are generally caused by the pressure exercised by the hard and growing fibroid upon the organs in the pelvis, the bladder, the rectum, and the nerves which pass along the wall of the pelvis. The pain caused in this manner may be of the most intense and severe character. It is situated in the bottom of the stomach, on one side or both, extends to the hips, to the back, and down the thighs and legs. It is sometimes like pins and needles, at others a numbness, and occasionally it is of an agonising character. Besides, there may be constant irritability of the bowels, a constant desire to go to stool, a slight diarrhœa, or a constant forcing and bearing down; or there may be difficulty at stool, the bowels may be pressed upon and the canal narrowed, and ultimately entirely obstructed, and complete inability to pass a motion may follow. The bladder troubles are sometimes the most prominent symptoms. The passage of urine may be entirely obstructed, complete retention of urine follow, and artificial aid be necessary to relieve the bladder; or, on the other hand, there may be a constant desire to urinate, and the quantity passed on each occasion amount to a few drops only; or the urine may pass involuntarily, the woman having lost all control over the bladder.

When the tumour is so large as to rise above the brim of the pelvis, it may easily be felt above the pubes by palpation of the abdomen. It feels hard, smooth, firm, round; or it may be of an irregular shape, as in those cases where the tumour is compounded of several small ones bound together, as sometimes occurs. It may be fixed and immovable, or it may be easily moved from side to side or from above downwards. It may be very tender to the touch, or there may be a good deal of pain in or over it. This is generally due to inflammation of its surface, or rather of the membrane covering it—the peritoneum. In consequence of this inflammatory action, adhesions not uncommonly form between the wall of the abdomen and the tumour; and in this way a tumour which was once freely movable may become firmly fixed.

*The Interstitial* form of fibroid tumour—that is, a tumour situated in the midst of the tissue of the uterine wall—has a tendency to assume one of the other two forms. It tends towards the inner surface or cavity of the uterus, or outwards towards the peritoneum or cavity of the abdomen; it does not remain stationary. When it approaches the cavity of the uterus it becomes sub-mucous; when the cavity of the abdomen, it becomes sub-peritoneal. Having reached the peritoneum, this outward progress may go on until the tumour is completely outside the wall of the uterus, and attached to it by a little stalk or pedicle only. This pedicle may remain short, or it may become greatly prolonged, so that a tumour of fibroid character may be felt to float apparently free in the abdominal cavity. Indeed, this freedom may be real, for the stalk may actually give way, and the pedicle be detached from all its connections.

*Sub-peritoneal Tumours* may not only become detached from the uterus, but they may also become attached to other organs in the cavity of the abdomen by adhesions due to inflammatory exudation. In this manner the real nature of a swelling or tumour may be so disguised that it is impossible to recognise its true character.

Fibroid tumours are easily discovered and distinguished in some cases, while in others this distinction or diagnosis is surrounded by the greatest difficulties. In the former case the veriest tyro may discover their presence, while in the latter the diagnosis may baffle the skill of the most accomplished expert. This arises from the fact that fibroid tumours of a certain size, and occupying a certain situation, are unlike any other tumour or swelling occurring in the pelvis; while at another time, being of a different size and in a different situation, they may resemble other swellings to such a degree as to be almost indistinguishable.

Fibroid tumours may be mistaken for several totally different conditions which occur in the pelvis, as new growths from other organs, as the ovary, and the product of inflammation. Tumours of the ovary sometimes resemble tumours of the uterus in their history, their symptoms, physical characters, as shape, position, hardness, so closely, that the distinction between them becomes impossible. They may also be mistaken for portions of the uterus when that organ is displaced and misshaped, and with other conditions, such as a loaded bowel, hæmorrhage into the neighbourhood of the womb, and so on.

The diagnosis can be made only after a careful examination of the abdomen and of the womb. The examination should be conducted both internally and externally. Some cases can be recognised by an examination through the walls of the stomach alone, but the great majority of cases require for the recognition of the condition present a careful examination of the womb and pelvic contents also.

The history of fibroid tumours is an uncertain one. Sometimes they grow very rapidly, at other times very slowly. They certainly begin, as a rule, between the age of twenty and forty-five, and their growth is usually most active during this period. After the change of life they have a tendency to decrease in size, or at least not to grow. This rule is, however, not without exceptions, for occasionally cases are seen in which the growth takes place very rapidly after the period we speak of. Sometimes they undergo a process of atrophy—a gradual diminution in



size until they entirely disappear. In other cases they become the subject of inflammation, and finally break down, and become converted into an abscess. In a third class of cases they become the seat of a deposition of lime salt, and the tumour becomes ultimately converted into a calcareous stony mass. In this form it may be driven into the cavity of the uterus, and afterwards expelled by that organ through the vagina, and passed externally. These have been called uterine stones. Such calcareous degeneration of fibroid tumours is not very rare, but their expulsion in the manner described is certainly a very rare occurrence. In other cases rapid death of the tumour may happen from some cause or other; it thus becomes converted into a sloughing, putrid, offensive mass. This is a dangerous termination, for absorption of the decomposed mass may take place; the system thus becomes poisoned, pyæmia sets in, and the life of the patient is in imminent danger.

Occasionally the action of the womb itself drives the tumour into its cavity, separates the mass from its attachment, and ultimately expels it altogether, thus effecting a permanent cure.

All the above terminations are, however, rare. The great majority of women affected with fibroid tumour of the uterus go on suffering more or less distress and discomfort from the presence of the tumour until the change of life. In the great majority of cases the tumours after this period do not increase, and often they actually decrease in size, and the symptoms due to their presence become less distressing.

The treatment of these cases naturally divides itself into two kinds—that for the relief of the symptoms and sufferings of the patient without materially acting upon the tumour itself, and, secondly, that for the removal of the tumour.

In the large majority of interstitial and sub-peritoneal tumours, palliative treatment alone is applicable. No radical cure can, as a rule, be attempted. The evils arising from this sort of tumour consist in displacement of the uterus, pressure on the surrounding parts, and flooding. The signs of pressure have already been mentioned. The displacement of the womb can in many cases be removed, and the distress arising from it be relieved, by elevating the tumour or the uterus and the tumour into the cavity of the abdomen, and taking means to retain it in that elevated position. The tumour should not be allowed to sink into the pelvis, because in that situation it is sure to give rise to symptoms of pressure. The elevated position of the tumour should be maintained by the introduction into the vagina of a suitable pessary, and removing everything that is likely to cause pressure downwards on the womb, such as tight clothing; and by slinging the clothes from the shoulders, or wearing a supporter or suspender for them in the form of a girdle supported by the hips. By these means the effects of pressure may be relieved, or even entirely removed.

The flooding may in most cases be controlled, though only to return again. The presence of the tumour in the uterine wall attracts a greater amount of blood into the organ, and this is a constant factor in producing the symptoms. The uterus is therefore in a state of chronic congestion. This congestion cannot be done away with altogether, but it can generally be reduced in amount. One of the most powerful means for its reduction is rest—absolute rest—in the recumbent

position, especially during the times of flooding. When a person floods, she should lie down on a hard bed or mattress. She should be kept moderately cool, and should not be allowed to move out of the recumbent position at all—not even to relieve the bowels and bladder; indeed, everything should be done for her. When rest is insufficient to arrest the bleeding, recourse should be had to medicines. The drinks should be cold—iced if necessary. Cold may be applied to the lower part of the abdomen, and to the private parts; small doses of diluted sulphuric acid may be frequently given, or large doses of the tincture of the perchloride of iron, the extract of Indian hemp, gallic or tannic acid, acetate of lead. These are the drugs usually given by the mouth, and in the great majority of cases they prove effectual as far as to arrest the bleeding. Should, however, these means fail, local applications become necessary. The vagina should be plugged by a wet bandage, a silk handkerchief, or a sponge; or the neck of the uterus itself may be plugged by lint or a tent. The latter would also dilate the canal of the neck, and thus aid not only in arresting the hæmorrhage, but also in clearing up the exact condition of the inner surface of the uterus. Should these fail, recourse must be had to surgical means. The exact means to be employed depend upon the nature of the particular case, and upon the immediate object in view. These medicines and surgical means can be adopted by a doctor only.

The second method of treatment is for the cure of the tumour, for the removal of it either by medical or surgical means. In the former, medicines are given with a view to prevent the growth of the new formation, to diminish the supply of blood into it, and cause its absorption. In the latter, the removal is effected by operation.

*Attempts at Removal of the Tumour by Absorption.*—Absorption is the process by which the veins and lymphatics take up material brought into contact with them, carry it away, and circulate it through the body. Attempts have been made at all times since these tumours have been known to effect their absorption by the administration of medicines. Sometimes success is obtained by their use, but this is rarely the case. Usually they appear to have little or no action on the size or the growth of the new formation. The medicines used and generally recommended with this object are iodine and bromine and their salts, iodide of potassium and bromide of potassium and of ammonia, arsenic, lead, and phosphorus.

Another method appears to promise more success, and that is the injection under the skin of ergotine—the active principle of ergot of rye. Ergot of rye is well known as a potent drug, having direct influence on the tissue of the uterus during pregnancy, and it is believed to act in a similar manner on the unimpregnated organ. For this reason it has been used to destroy fibroid tumours. It is, as has been already said, injected under the skin; it is absorbed into the circulation, acts upon the muscles of the uterus, and compresses the vessels in its walls. In this manner it diminishes the supply of blood into the tumour, and when the supply of blood is cut off from a part or diminished, the nourishment of that part is cut off or diminished. The consequence of this is, that the tissue of the tumour begins to undergo degeneration, a formation of fat takes place in it,



this is in its turn absorbed, and the tumour consequently diminishes in size and substance. It undergoes a process of atrophy. This process is occasionally associated with some inconveniences from the peculiar effects of the ergot on the general system, from the abscesses which occasionally follow in the places where the injection was made, as well as from the pain which arises consequent on the muscular action called forth in the uterus.

Salts of lime have been used with a view to cause a deposit of calcareous matter in the substance of the tumour, and in this manner check its growth. The chances of success are slight, and the evil effects of the lime salts on the general system forbid its use, except in a few cases, and under the most careful supervision.

For some years the attention of physicians and surgeons has been directed to the surgical treatment of these growths, and has been attended with a fair amount of success. The number of cases, however, suitable for surgical interference is comparatively small, but some cases of a desperate character—cases in which no hope could be held out, except by removal of the tumour by surgical means—have by those means been rescued from their peril, and restored to health. There are various ways in which the removal of such tumours can be surgically effected. The means employed would depend on the character of the subject, the size, the situation, and the surroundings of the tumour. As a rule, these operations are attended with great difficulty, and moreover they are not free from danger. Still, great success has attended some of the most formidable operations, even in the most desperate cases. Such cases do not often occur, but when they do, surgical means are the only ones which hold out any hope of prolonging life and of restoration to health—and rather than meet a premature death, art should be allowed to interfere to save the threatened life. Such cases are amongst the greatest and most dazzling triumphs of modern surgery. When hope fails, and death appears to approach to seize its victim, the surgeon's knife steps forward into the arena, snatches the victim even from the grasp of the foe, and restores her to her friends, and gives back to her health.

*Polypus of the Uterus* is another not uncommon cause of flooding. A polypus is a tumour growing from the inner surface of the uterus. Polypi may be attached to the uterine wall by a stem, and then they are called pedunculated; or may be attached directly to the wall of the organ without the intervention of a pedicle, and then they are called sessile. They differ much in size, sometimes being no larger than a pea, at others as large as a melon. Their structure depends to some extent on their origin. They vary much in consistence, some being hard and firm, and others soft and gelatinous.

The hard or fibroid polypus is similar in structure to a fibroid tumour; indeed, it often is only a later stage of the latter. The fibroid tumour is constantly subject to the action of the contracting uterus. In this way there is a tendency to drive the tumour into the abdominal or uterine cavity; if it be driven in the latter direction it becomes a polypus. This polypus is at first sessile; it has no pedicle, and indeed projects but slightly into the uterine cavity, but after more or less time the continued expulsive action of the uterus drives it farther and

farther from its original seat, and the polypus becomes pedunculated ; later it often is driven out of the cavity of the uterus into the vagina, and may ultimately be separated altogether. This form of polypus grows usually on the upper part of the uterus, but it occasionally grows from the neck or lower part.

The soft or gelatinous polypi are usually very small, and never attain a great size. They are enlargements of the glands of the mucous membrane of the lower part of the womb. They are supplied with a large quantity of blood, and are usually congested through pressure. They grow from the canal of the neck of the uterus.

*Placental Polypus.*—Sometimes portions of the after-birth, or placenta, are retained in the womb after labour or miscarriage, and these become organised, attached firmly to the wall of the uterus, and live. This kind of polypus is intermediate in hardness between the other two. They have, of course, a structure similar to that of the after-birth itself, with varying proportions of blood. These may remain in the uterus for a very long time, even years.

There are no known causes of polypus except the last-named.

*Symptoms.*—The most prominent symptom of polypus of the uterus, and the symptom which first directs attention to its presence is flooding. At first this may happen only at the time of menstruation—the flow being profuse, clotty, and prolonged ; but after a time floodings appear at any time during the intermenstrual interval, and often they last for weeks. During the intervals when the patient is free from hæmorrhage there is a profuse white, yellow, or watery discharge. Sometimes this discharge has a very offensive odour, and causes a suspicion of cancer. There is pain in the back, bearing down and sometimes violent pains like the pains of labour, bearing down and forcing in the bowel ; there is a continual desire to pass water, and often forcing in the bladder.

In the majority of cases the doctor has no difficulty in recognising the presence of a tumour of this kind. Sometimes it is driven outside through the vagina, and hangs by a thin fine stem only ; then it is easily seen. In other cases an examination will reveal the nature of the case. The womb is enlarged, the mouth of it is open, and the tumour projects into the vagina, or, if lodged in the uterus, it may be felt with the finger. In some cases, however, the mouth of the womb has not been sufficiently dilated to allow of exploration of the cavity ; then it becomes necessary to effect such dilation before the nature of the case can be properly made out. When the polypus is small it may escape detection, even though every means at our disposal be employed.

Polypi are sometimes entirely expelled, and Nature effects a complete cure ; in other cases they become calcified, or inflammation and mortification sets in in the growth and it perishes ; or absorption of the fœtid products may take place, and the patient becomes affected with blood poison. Their course, however, unless interfered with, is one of prolonged suffering and ill-health. The constant drain upon the constitution from the bleeding and the leucorrhœal discharge exhausts the system, and may bring on permanent disease.

There is but one way of dealing with these growths, and that is to remove them. When flooding has been taking place for a length of time, the cause of it should be



definitely ascertained; and if that cause should be polypus, it should be at once removed. There are safe ways of doing so without incurring the risk of bleeding, and indeed without incurring the danger that may arise from the presence of the tumour. The cure is permanent.

*Cancer of the Womb.*—We enter now upon the consideration of one of the most awful of the diseases to which the human frame is subject. It is regarded with fear and dread by all, on account of its malignant and fatal character. It is a disease which may attack almost any part of the body, and in a very large number of cases it proves fatal; while in others—but unfortunately the few—it may be entirely removed and eradicated. The cases in which the disease is curable consist of those where it has attacked parts of the body which can safely be removed by operation. When it attacks the womb, it is usually that part which is easily reached, which is not essential to life, and which may safely be cut off. It attacks the mouth of the womb. It is but rarely—very rarely—that the original seat is in the body of the organ.

Cancer is a disease of old age, or at least of the time of life when the nutrition of the tissues has become less active and is on the decline. It is met with usually between forty and fifty years; at the same time it may be seen in old people and in young children. It is, however, a very rare affection in children, and when seen in them it runs its course and proves fatal with great rapidity; while in old people its course is slow, and its duration more prolonged. The causes of cancer are unknown. It is believed to be hereditary; it is transmitted from parent to offspring. If the parents have suffered from cancer, some of the children may suffer in a similar manner. When the constitution of cancer has been inherited, slight causes are said to bring on the disease, such as blows and slight injuries.

Cancer of the womb occurs more frequently in the married than in the single, in those who have had children than in those who are barren, in those who have had many children than in those who have had few; so that it appears that fecundity, and the processes of bearing and giving birth, seem to favour the development of this disease. Cancer is not contagious. It cannot be transferred from one person to another by contact; it cannot be inoculated in another person.

There are several forms of malignant disease of the womb which have been usually classed under cancer. Some of them are very rare, as the hard cancer. This, though met with frequently in other parts of the body, rarely affects the uterus. The forms usually met with in the womb are the cauliflower growth of the neck, or the epithelial variety, and the encephaloid.

Both these varieties form tumours, the latter in the neck of the womb, and the former attached to it like a cauliflower mass, as its name implies. The encephaloid is hard, irregular, or nodular, growing in the cervix, and not attached to it. The cauliflower mass is soft, spongy, and breaks down easily. These diseases are characterised by rapid growth. They increase quickly in size. In the early stages of their existence they appear to be limited to the neck of the womb, and may be removed entirely. This is especially true of the cauliflower growth. It rapidly extends, however—a few weeks or months suffice for it to extend to the neighbouring parts. The vagina, the rectum, and the bladder become involved. Soon the

mass begins to break down and mortify or slough. When this takes place, shreds are passed, and an ulcer is formed in the womb. Ulceration goes on and involves the surrounding parts; the bladder and rectum may be opened, and the whole or nearly the whole womb eaten away.

The symptoms of cancer may show themselves at a very early stage of the disease, or they may not appear until the disease has existed for a long time, and made serious progress. One of the first symptoms which usually attracts the attention of the patient is a flooding. This sometimes comes on early, before ulceration has taken place, and it may be very considerable in amount, or it may be a constant pinky discharge. Before this appearance of the flooding or discharge of blood, there has been usually a little white, or yellow, or watery discharge, but often in such small quantity as to be considered of no importance. When a profuse flooding, or a constant pinky discharge is present, attention is directed to it, and advice sought.

After this there is usually an abundant watery, gummy discharge. This comes on when the tissues begin to break down and ulcerate. The discharge often contains shreds of tissue, clots of blood, and is exceedingly offensive and irritating. The foul smell it possesses sometimes makes the patient a burden to herself and to those near her. This is occasionally the chief cause of complaint. This discharge causes irritation of the external parts, and may give rise to the most obstinate itching.

Pain is another symptom of cancer. It is present in some cases from the first, while in others there is but little pain throughout the whole course of the disease. The pain is in the bottom of the stomach, and is of a gnawing, stabbing, or lancinating character. It is sometimes constant and severe.

When ulceration has begun, the disease makes more rapid progress. The discharge becomes very profuse, there are frequent floodings, and constant watery or serous discharge. These losses weaken the patient, and undermine the constitution. She loses flesh, and loses it rapidly, becomes thin, and occasionally very thin; a peculiar tint of skin soon appears, a slight yellowish-green colour. This appearance, when well marked, is almost characteristic of cancer. When the disease has extended to the neighbouring tissues or the glands of the pelvis, the broad ligaments of the uterus and the ovaries, a tumour may be felt in the bottom of the stomach. The disease having invaded the peritoneum, causes inflammation of that structure, and gives rise to pain and tenderness.

When the ulceration has extended to the bladder and rectum, the contents of those organs are forced into the vagina, entailing the greatest misery upon the sufferer.

Cancer can with care be readily recognised by a doctor, but there are some forms of disease with which it is occasionally confounded, such as polypoid and fibroid tumours and certain ulcers, together with papillary growth of the neck of the womb.

Few cases of cancer recover. Rarely Nature alone effects a cure. If the disease be recognised in its early stage, there is no doubt that removal is the best method of treatment, and the only one that should be adopted. It admits of no



delay. The case may be a suitable one for operation to-day, for it is possible to remove it entirely, but in a week or in a month other tissues may have become involved, so that it is impossible to remove the whole of the affected tissues. When this is the case, the treatment can be only palliative. The pain should be relieved by narcotics. Strict cleanliness should be enjoined so as to remove all discharges, and for this purpose an injection containing some disinfectant, as carbolic acid or Condyl's fluid, may be used. The diet should not be too full. Rest is necessary, for motion frequently brings on flooding. It may be advisable to remove as much of the growth as is possible, with a view to check the bleeding. In this case astringent pessaries made of tannic acid and cacao butter will for a time effect this object. Nothing, however, can arrest the progress of the disease, yet removal of a part of it may so far palliate the symptoms as to render life tolerable. The disease brings with it occasionally a train of complications, such as inflammation round the womb, inflammation of the abdomen, poisoning of the blood, dropsy of the kidneys, which, inasmuch as their cause cannot be removed, must be permitted to run their course. The only help that can be rendered is that for the relief of pain, to prevent flooding and fever, and to keep up the strength.

*Ulceration of the Uterus.*—Ulceration of the womb is an affection said to be of very frequent occurrence, and a great number of the troubles from which women suffer have been ascribed to it. The part of the womb affected by ulceration is that which projects into the vagina, and is called the cervix. The term ulceration is applied to true ulceration where there is destruction of tissue, and also to another condition, where there is only removal of the thin layer of cells covering the part—of the epithelium. The latter condition is a very common one, while the former is of much greater rarity. Indeed, abrasion of the epithelium covering the lips of the uterus is found in almost all cases of long-standing uterine disease. It is most marked usually at the edges of the orifice of the uterus, but it may extend for some distance over the lips and up into the cavity of the womb. It is often very slight, and it may be difficult to say whether it is really present or not. It presents to the finger a soft velvety feel, and to the eye a red or dark-red congested appearance. In most fairly marked cases this condition can be readily diagnosed by the finger alone. This ulceration is said to give much trouble, and to prolong and aggravate other uterine and ovarian diseases. They tend to keep up congestion of the womb, and in this way give rise to a constant discharge of "whites," and frequently to floodings. The patient also suffers from pains in the back and bottom of the stomach—a constant aching. The pains and the losses of blood and whites keep up a constant feeling of discomfort and uneasiness, and together reduce the strength and depress the spirits of the patient, until often she feels unfit for occupation of any kind.

The causes of this condition are sometimes somewhat obscure, but often its causes may be discovered and removed. The bad state of general health, or a derangement of the whole system, may give rise to abrasions of the womb. In these cases the treatment should be general and local. The strength of the patient should be improved by tonics, as quinine, iron, bark, mineral acids. The bowels should be regulated by mild laxatives. The dyspepsia from which these patients so

frequently suffer should be removed by regulating the diet and by appropriate medication. The food should be of a nourishing character—milk and a fair amount of animal food. Stimulants should be taken sparingly, or not at all, unless absolutely required to improve the condition of the stomach and favour digestion. When required, they should consist of sherry, or a little weak brandy and water. But again it should be said that it is better to avoid them as a general rule.

The question of exercise is one on which opinions differ considerably. Some believe that absolute rest is required, while others advise exercise in the open air. This question can only be decided for the particular case. No general rule can be laid down with regard to it, except, perhaps, that when the patient feels equal to taking exercise in the open air she should do so. Not the ulceration only, but the complications which accompany it, give indications of the necessity for taking or refraining from exercise. The local treatment consists, in the first place, in cleanliness—in injections of simple warm water night and morning. This removes the secretion—which is occasionally very irritating—from the part, and gives a fair chance for the *vis medicatrix nature* to effect healing of the sore. Frequently, however, other means are necessary, such as alum or sulphate of zinc in the water injection. The astringent action of these substances tends to diminish the size, or to contract the vessels of the part, and thus to relieve the congestion. In some cases bleeding is performed—a leech is applied to the womb, or a few punctures are made in the lips of the cervix by means of a short lancet. Other cases are treated with lunar caustic—the solid nitrate of silver—or by other stronger and more powerful agents. These latter are very powerful caustics; they destroy the unhealthy tissue for some depth, and when the dead tissue which forms in consequence falls off, a healthy surface is found beneath. This, after a time, gradually heals, and the epithelium forms over it.

True ulceration—that is, destruction and removal of something more than the epithelium on the surface, the destruction of an appreciable thickness of the tissue of the cervix—is much more rare than simple abrasion.

This form may affect every part of the cervix, or it may be limited to the margins of the uterine orifice. The ulcer is of an irregular shape, and presents a granular uneven appearance; or it may be covered with a greyish or yellowish substance. The cervix of the uterus is red, swollen, and congested. This congestion extends through the whole of the womb, and even to its appendages. There is an abundant discharge from the womb, of a yellowish colour. There is a pain and a feeling of uneasiness in the pelvis, a bearing down and aching in the back. Sometimes the diseased part causes more or less profuse hæmorrhage. There are frequent attacks of floodings. The general health suffers in consequence. The patient becomes pale and nervous—often hysterical. The stomach becomes deranged, the appetite is lost, the bowels confined. The patient becomes weaker; she complains of headache and pains here and there over the body. She gives up taking exercise, feels unfit for exertion, and becomes a confirmed invalid, and is confined to her couch.

The treatment is much the same as that of simple abrasion.

*Rodent Ulcers.*—This is a disease of a much more severe character than the two



former. It partakes of the character of cancer, inasmuch as it is malignant. Like malignant disease, it is rarely, though it is occasionally, met with in the young. It is a disease which makes slow progress. It is much less rapid in its course than true cancer. It affects the neck of the womb, and may extend along the surface, healing at one part while extending at another; or it may eat deeply into the substance of the uterus.

The treatment consists in keeping up the general health—cod-liver oil, iron, rest, good food, and hip-baths. Strict cleanliness should be enjoined, for the discharges from it are of an acrid character. If there is pain, anodyne injections or pessaries containing opium, morphia, or belladonna, should be employed under proper advice.

*Subinvolution of the Womb after Delivery.*—During pregnancy the womb enlarges to several times its size in the virgin state. After labour it weighs about a pound and a half, or even more. The process by which the organ is reduced to its original size is called “involution.” This process should be accomplished in a month, or at most six weeks, after delivery. Sometimes it fails, or takes a longer time than usual; then involution is said to be impeded, and the womb to be in a state of “subinvolution.” This is a condition very frequently met with, especially in the poorer classes of the inhabitants of large towns, as well as in those who live in luxury and ease.

Involution is accomplished in part by the muscular contractions of the womb itself, in part by absorption of the fat formed in the degenerated elements of the uterine tissue, in part by the discharge which escapes from the organ after delivery. Whenever any one of these three factors is interfered with, involution fails. There are numerous causes which arrest the proper changes in the womb after delivery, and give rise to subinvolution.

Amongst these the state of the general health plays a very important part. All exhausting diseases—as disease of the lungs, liver, or kidneys, fevers, scrofula—give rise to a general want of power in the system, a want of muscular power; the muscular system does not act with the vigour met with in health, and in such circumstances the womb after delivery acts in a languid and feeble manner. This permits the organ to remain larger, less firm, and more flabby than natural; a greater quantity of blood is allowed to circulate, or, rather, to stagnate in it. This is in a high degree unfavourable to the occurrence of rapid healthy changes, and the consequence is that involution goes on slowly and imperfectly; the womb remains larger than it should be, and a low form of inflammation of the womb, with an abundant white and yellow discharge flowing from the organ, is the result.

During labour the neck of the womb is pressed upon by the head of the child, and in all cases that part is more or less bruised and lacerated. This natural condition greatly favours subinvolution, because it is a source of irritation, and tends to attract an increased flow of blood through the organ.

Rest is one of the most powerful agents in the treatment of disease, one of the most valuable aids in bringing about healthy changes. In the form of sleep it has aptly been designated “Nature’s sweet restorer.” The expression may not inappropriately be extended to all forms of rest, physical, mental, or functional.

After the functional activity of pregnancy, the physical activity of labour, and the mental excitement associated therewith, rest—absolute rest of mind and body—is a most imperative want. Rest in bed for at least a fortnight should be enjoyed by every young mother, and rest on the couch for a second fortnight. By this means alone many of the evils which follow pregnancy and labour may be avoided. Want of rest, too early getting up, and excitement are among the most common causes of subinvolution and the evils which follow it.

Want of food acts as a cause of arrest of involution in numberless cases amongst the poor of our large towns. They go for days during pregnancy without meat of any kind, and perhaps taste fresh meat once only in a week or a fortnight; and when their time of travail comes, it proves also a time of imperfect starvation. They have not the necessaries of life, much less the little delicacies which are acceptable to a woman at this time. Not only do they suffer from want of food, but want of rest comes in to aid it in its injurious influences, and the two are sure in their effects. This accounts for the exceeding frequency with which subinvolution is met with in the class of people named. Supply them with sufficiency of food, and the improvement in the condition of the subinvolted womb is marked and rapid. Fibrous tumours, polypus of the womb, and flooding—the two former uncommon, but the latter a frequent cause of imperfect involution—give rise to permanent enlargement of the womb. The two former are rare causes of this disease, because it is not common for a woman who suffers from either of them to conceive or become pregnant. Flooding after delivery, however, is a frequent occurrence in the weakly, and a prolific cause of uterine disease.

Inflammation of the womb, or of the tissues surrounding the womb, sets an effectual stop to the changes which naturally take place in the recently emptied uterus.

The sympathy between the breasts and the womb is at all times manifest, but during pregnancy and after delivery in a more marked and palpable manner than at any other period. The secretion of milk and the act of suckling are favourable to the natural changes which take place during the lying-in month. Indeed, nursing is the most healthy stimulus to involution of the uterus; and it is an unfortunate occurrence when the breasts refuse to perform their natural function of secreting milk. Under such circumstances recovery is more tedious and less complete than when the breast functions are naturally performed. How much more injurious must it be, then, when the breasts act healthily and vigorously, secrete abundance of natural food for the infant, but the mother refuses to perform her duty! There is no doubt that the neglect of maternal duties in respect to suckling is a prolific cause of disease of the womb. On the other hand, nursing may be over-done. It is not uncommon to see strong and healthy country women nursing their children for two or even three years, and it does not appear to do them any harm; but this is owing to the native strength of their constitution, to the fresh air which they breathe, the plain nourishing food which they take, and the regular habits which they practise. Without all these it would be impossible for them to nurse for such a time without any grave and serious effects. The inhabitants of towns when they nurse for a long period—as



they occasionally do—pay the penalty after the next pregnancy. Their system is soon enfeebled and exhausted. They cannot bear a prolonged drain upon it, and subinvolution and uterine disease is the inevitable result.

Subinvolution gives rise to pain in the back, bearing down on the pelvis, a feeling of exhaustion, and languor and lassitude, inability to walk, and unfitness for exertion. There is usually profuse whites and often profuse menstruation, or flooding. With these symptoms are frequently associated others due to the general state, as headache, giddiness, extreme general weakness, pains in the side, shortness of breath, palpitation, constipation, &c.

The treatment of this affection when undertaken early is favourable. It can, as a rule, be easily cured. If, however, it be allowed to go on unattended to for months or years, then changes take place in the womb, which will remain more or less permanent in spite of all treatment. Hence the importance of early attention in those cases where the recovery after delivery has been imperfect.

The first requisite for cure is rest—especially after labour—rest in the recumbent posture. A good, plentiful, nutritious diet should be given. A little wine is very useful to help digestion in these cases. The bowels should be kept regular, and twice a day injections of warm or cold water, according to the nature of the case, should be made into the vagina. Tonic medicines are necessary to improve the blood and strength; bitters or acids and bitters to improve the appetite; then steel, or steel and quinine, will prove of great benefit. Should there be any active cause of the condition, as nursing, it should be stopped at once. If the discharges from the vagina be profuse, they should be arrested by injections of astringent substances, as decoctions of oak-bark, tannin, alum, &c. There are some medicines which act directly on the womb, and these prove occasionally useful. Of these the best, and the one usually given, is ergot of rye. It should be given in combination with iron. It is hardly necessary to add that fresh air and healthy surroundings are necessary to a rapid recovery. As soon as possible the patient should go for change of air and scene. This acts most beneficially upon the general health, and thus improves the tone of the whole of the muscular system, and favours involution.

*Inflammation of the Womb.*—Any part of the womb may become the seat of inflammation, the abdominal surface, the internal surface, or the whole tissue of the organ. It may be brought on suddenly, and then is said to be acute. This happens more frequently after labour than at any other time; indeed, acute inflammation of the virgin womb is of very rare occurrence; and when brought on, is due to foolishness or negligence. Its causes are suppression of the menses through exposure to cold at the time of menstruation, the use of cold or astringent injections at or about the time of the menstrual flow, and injuries from falls, blows, &c. The two first causes may, and ought to be, entirely avoided. A woman ought to know the time of the appearance of the menses, she should not be taken unawares, and should be prepared for their appearance. Unfortunately, however, the slight care and observation required for this is frequently not taken, and some, but by no means all, have to pay the penalty of carelessness in acute suffering.

The symptoms are stoppage of the flow, shivering, heat and pain in the pelvis,

pain in the back and thighs, bearing down, distension of the abdomen. There may be high fever, sickness, nausea, and painful micturition. The inflammation extends in some cases from the womb to the bowels; then there is great fever, acute pain, severe sickness, distension of the abdomen, shortness of breath, drawing up of the knees. The least movement of the patient, or the least pressure on the stomach, gives rise to the most intense suffering. This is a very dangerous disease, and may prove fatal.

*Treatment.*—Medical advice should be sought without delay. Meanwhile, hot applications, as linseed-meal poultices or fomentations, should be applied to the abdomen, injections of warm water to the vagina. The further treatment of the case depends upon the symptoms present. In some cases leeches or gentle purgatives may be needed. In others warm hip-baths, and in others leeches to the abdomen and fundament; while in some cases opium is of the greatest use. But inflammation of the womb does not always come on suddenly. It comes on insidiously, and the sufferer is not aware of it until it has existed for some time and has become thoroughly established; or having set in as an acute attack, it does not entirely pass off, but slides into a milder form, which remains for a longer or shorter period. It is then called chronic inflammation. At first this form, when it comes on insidiously, gives rise to few, if any, symptoms. It is certain, at any rate, that these are so slight that they do not attract the attention of the woman. One of the first things that excites suspicion of something wrong is a leucorrhœal discharge—the “whites”—and this is allowed to go on without treatment for months or even years. This discharge may be viscid, sticky, transparent, like white of egg; or it may be a thick, yellowish, or greenish fluid, like matter; or it may be a thin, watery, pale fluid, having most irritant properties—giving rise to inflammation and excoriation of the external parts and upper parts of the thighs. Just before and after the monthly flux the discharge may disappear or be greatly increased in quantity. The menses may be accompanied by much pain, the discharge being profuse and clotty. In time the womb becomes tender, increases in size and weight, and sinks in the cavity of the pelvis. There is a feeling of heat and pain in the bottom of the stomach, bearing down, and a sense of fulness, dragging in the back, loins, and thighs, and sometimes sharp pains in the womb itself. The bladder also suffers; there is pain, and constant desire to pass water, sometimes there is difficulty in micturition. The bowels suffer in a similar manner; there is a forcing in that situation, frequent desire to go to stool, and pain with it. Walking becomes painful.

In course of time the general health suffers, the appetite fails, vomiting sets in, the bowels become constipated, there is headache, giddiness, pain in left side, and deterioration of the blood due to imperfect action of the stomach. Menstruation becomes painful and profuse, general nervous symptoms set in, neuralgic pains in various parts of the body, and confirmed hysteria.

The causes of this condition are, in the first place, those which produce the acute form—exposure to cold during a menstrual flow, either from washing in cold water, getting wet, or getting the feet wet, or simply insufficient clothing; irregular appearance of the menses seems to give rise to it also; over-exertion during the



menstrual flow ; displacements of the womb, abortions, miscarriages, and labour, and the subinvolution which follows them.

When attended to early, the disease is easily cured ; but in most instances, as is usual in diseases of the womb, it has existed for a long time before anything is done to alleviate or cure it. Indeed, owing to the insidious manner of its early course, it is often not possible to take it at the start, and consequently treatment is often required for a long period. One of the most important agents in the treatment is rest. The sufferer should lie in the recumbent posture. It is not necessary for her to lie in bed, but she should be moved during the day from the bed to the couch. She should not stand on her feet or walk about—this always aggravates the suffering. The bowels should be well regulated. Nothing is better for this purpose than saline aperients. Epsom salts are perhaps the best of all. They tend to relieve congestion. They can be regulated according to the patient's wants. The taste is offensive, but it can be pretty well disguised by the addition of a little syrup of lemon. Mineral waters are of service, and a sojourn in one of the English or foreign watering-places will in some cases effect a cure. The diet should be good, nourishing, easily digestible. Malt and spirituous liquors, or wine, should be avoided, or taken sparingly, as they seem to have an unfavourable influence on the congested womb. Light wines are the best when necessary. They should be taken for the sake of the digestion only ; when the stomach performs its work efficiently they should be avoided. Unfortunately, it is rarely that the digestion is good, especially when the disease has lasted some time, and the use of wines becomes then necessary.

There is no medicine which has a direct and specific influence on the inflammation. But the general troubles associated with the condition should be met by acids and bitters, or, in some cases, soda, with bitters to improve the appetite, and then by tonic medicines to improve the state of the blood. Quinine, gentian, calumba, and iron are all useful in their turn. Local treatment is also usually necessary in these cases. Leeches to the fundament, or to the womb itself, or the withdrawal of a little blood from the uterus, applications of caustics, astringents, absorbents, or alteratives to the neck, or to the interior of the womb, may become necessary. Injections of hot or cold water, according to the individual case, may prove useful ; or, if there be pain, injections of solutions containing soothing or anodyne substances, as opium, or pessaries containing opium, henbane, or belladonna. None of these, however, should be used except under medical advice.

*Inversion of the Uterus.*—In this disease the womb is turned inside out, and lies in the canal of the vagina, or projects outside the vulva. It may be complete, or only imperfect. It is a rare affection, and is usually brought about suddenly after labour, as the after-birth is born, or gradually through a dragging on the inside of the organ by a polypus attached to it. When it comes on suddenly, as after labour, the patient has pain, feels faint, violent flooding sets in, the patient becomes collapsed, and, unless relieved at once, death may ensue. When it comes on gradually, it is due to the expulsion of a polypus, and consequent dragging on the womb. Then there is flooding, occasional or continuous ; pain in the back, loins, and pelvis ; walking is difficult ; pain and difficulty at stool and in making

water. When these symptoms have lasted some time, the constitution begins to sink. The continual loss of blood and pain depreciate the state of the blood, the appetite fails, the woman becomes pale, thin, and suffers from all the evils attendant upon a watery condition of the blood.

The condition of the womb can be recognised only by a careful examination of the organ.

When the womb is inverted suddenly after labour, attempts should at once be made to return it to its proper position, and in most cases these are successful. Even when it has been out of position for a long time, similar attempts with the same object should be made. In the latter case, however, there are many difficulties to be overcome, for the organ has become reduced to nearly its usual size, and its tissues have become hardened, and consequently the resistance to re-position is very great. By long patience, however, and by pressure exercised on the inverted part for a protracted time, these difficulties have been overcome in some cases which had appeared hopeless. This has been accomplished by the introduction of an elastic ball into the vagina, which, after its introduction, was distended with air, and the exercise of continuous elastic pressure on the inverted part ultimately caused it to resume its natural position. Reduction of the inverted womb usually demands the greatest skill.

When this has quite failed, the bleeding which takes place from the inverted surface should be checked. The whole of the tumour should be bathed in an astringent solution, as of alum, tannin, acetate of lead, and surrounded with strips of lint soaked in one of these solutions; or in some cases strong caustics may be used, and it is said that these not only check the hæmorrhage, but reduce the bulk of the inverted organ—a result greatly to be wished.

When the inverted womb cannot be returned, and when the hæmorrhage becomes so obstinate as to threaten life, then, as a last resort, the organ has been removed. This operation has been performed several times with success; at the same time it is fraught with such danger to life that it should be resorted to only as a last chance of prolonging life.

*Hæmorrhage in the Neighbourhood of the Womb, into the Cavity of the Belly, or into the Tissues.*—Blood may be poured out in this situation from a number of sources. It is due generally to rupture of some small blood-vessels, or to blood disease. It usually happens between the age of fifteen and forty-five, more often about the time of menstruation than at any other. Pale, weakly women and stout women are said to be more liable to it than others. It is caused by violent efforts at the time of the menstrual flow, violence from falls or blows, and disease giving rise to an impoverished state of the blood.

It begins usually with a heavy dull pain in either groin, and a profuse menstruation or flooding. The menstrual flow often lasts a much longer time than usual. Then a sudden sharp severe pain is felt in the bottom of the stomach, the woman turns pale, faints, and becomes cold; soon she vomits. If this happen during menstruation, the flow may be completely arrested, or a profuse flooding may set in. There is bearing down in the pelvis, and forcing in the bladder and bowel. Sometimes there is difficulty, or even inability, to pass water or stool. The patient



has a sense of weight in the bottom of the stomach, as if a heavy body were present in that situation. The abdomen becomes blown up with flatulence.

These symptoms pass off after a longer or shorter time, and symptoms of reaction set in. From the loss of blood and the sudden shock, the patient is naturally weak and exhausted. She is pale, often extremely pale—blanched. She soon becomes feverish, she is chilly, or may have slight shivering, the skin is hot, there is thirst. The tongue is foul, and the mouth dry. The bowels are confined, in some cases obstinately so, owing to the obstruction caused by the pressure of the effused blood on the bowel. There may be frequent desire to pass water, or entire suppression. The bleeding is in some cases so great as to give rise to a tumour extending up as far as the navel. This is smooth, with usually an uneven upper border. There is pain and tenderness over the lower part of the belly.

It is a disease which rarely proves fatal. Most cases recover, though in some bad cases death has resulted from the loss of blood.

*Treatment.*—When the symptoms first set in, perfect rest should be at once secured. The sufferer should lie on the back in bed, and cold be applied to the lower part of the abdomen. Should there be any sickness, ice should be sucked. If the sufferer be very faint, stimulants should be administered, as champagne, brandy, or ammonia. Medical advice should be sought at once. Opium is of great service in this condition, but it is a drug that requires great care in its administration. When the stage of hæmorrhage and collapse is over and reaction has set in, the worst is generally past, though the illness may still prove protracted; yet there will be but little doubt as to the issue, provided the patient submits to be treated. Rest is a most essential condition of rapid recovery. A quantity of blood, varying in amount, has been poured out of the vessels, and this is to be absorbed. This is a slow process, but it is surprising with what rapidity it will go on under favourable conditions. Rest is necessary not only to favour absorption, but to prevent inflammation and a further pouring out of blood by disturbing the parts. Movement may cause a considerable increase in the size of the tumour formed by the effused blood, and it may do this at any part of the process of recovery, and therefore rest should be secured with scrupulous care. This alone is in some cases sufficient treatment. Others require both local and general means to ensure a rapid recovery. Counter-irritation of the lower parts of the abdomen, by means of blisters or of a solution of iodine, is of great use. Both these act favourably in dispersing or in exciting absorption of the hæmorrhagic tumour. Blisters should be frequently repeated, and allowed to heal rapidly, or if a solution of iodine be preferred, the skin should be constantly kept sore with it. Sometimes the tumour, instead of becoming solid, remains fluid, or forms an abscess. In such cases it is not unusual to open it, and make an exit for the fluid or matter it contains.

The diet should be good, easily digestible, and sufficient. A little stimulant is useful—a small quantity of wine or brandy. Tonics, after the febrile condition has passed, are administered with a view to improve the stomach, the blood, and increase the strength, and in this way to hasten the process of absorption. The bowels should be kept open, the bladder emptied by means of a catheter if there be retention of urine. Pain should be alleviated by opiates.

Occasionally profuse flooding has taken place at puberty, the menses making their first appearance as an abundant hæmorrhage. These cases are not very uncommon, but it is rare for such bleeding to be so profuse as to prove fatal, yet in some instances that has happened.

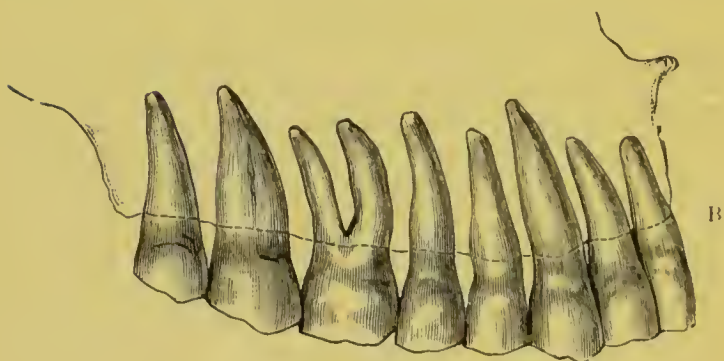
During the change of life, on the other hand, floodings are exceedingly common; and the time called the "dodging-time" is to most women a time of anxiety. The complete cessation of the menstrual function sometimes takes place quite suddenly. The woman is regular every month; the amount of the flow and its character are normal. It appears at the usual time, but never afterwards. The function has ceased. In other cases, again, the flow appears regularly from month to month, but in decreasing quantity, until it disappears entirely. In a third class of cases the flow becomes irregular; it is absent for two or three months, and then reappears again, then disappears for some time, then returns as a profuse flooding. It may go on in this manner for months, or even years, the flooding lasting at times for weeks, and proving a source of grave danger.

A number of other symptoms make their appearance about this time—symptoms of nervous derangement and of disorders of the stomach and intestines. Headache, pains here and there over the body of a neuralgic character, depression of spirits, a gloomy state, irritability, loss of memory, forgetfulness, and waywardness, are now and then seen at this period of life.

One of the most peculiar occurrences of this period is the conviction of the existence of pregnancy acquired by women, when no such state is present. This has been called spurious pregnancy. It is seen not at this period of life alone, but at any other time after twenty or twenty-five. Women who have had several children are sometimes mistaken in this way, and it is not easy to convince them of their error. It is due to the nervous state present, and to disorders of the stomach and bowels. Constipation is frequently present, and when already acquired becomes aggravated. There is a tendency in many to become fat and stout. Flatulence and flooding are very common causes of complaint at this time. This period of life has always been regarded as in some sense critical, and rightly so. Certain diseases take a favourable, others an unfavourable, turn at this epoch. Some diseases disappear, while others start into existence. If a woman passes through this stage of life in a favourable manner, she has good reason to expect fair health afterwards; she may be said to take a new lease of life.

*Treatment.*—The treatment of the troubles of this period are careful dietetic and hygienic measures. The diet should be plain and simple—meat once a day: fish, meat, game, poultry, with bread, vegetables, and fruit. Beer and spirits should be avoided, and wine taken very sparingly. The bowels should be regulated, A blue pill occasionally, with a saline draught on the following morning, is of service, for the liver acts sluggishly. Indeed, all the secreting organs are somewhat inactive in the performance of their functions. Friedrichshall, Pullna waters, Carlsbad and Vichy salts are very useful, and in some cases should be regularly used. In some robust and plethoric women a few leeches, or occasional cupping, or even a general bleeding, may occasionally be called for. For the nervous symptoms sedatives are recommended, especially the bromide of potassium.





# TEETH.

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| A. Grinding surface (upper jaw).              | C. Side view, with fangs exposed (lower jaw). |
| B. Side view, with fangs exposed (upper jaw). | D. Grinding surface (lower jaw).              |





## CHAPTER IV.

DISORDERS OF MENSTRUATION (*continued*).

Painful Menstruation, or Dysmenorrhœa—Neuralgia of the Womb—Congestion and Inflammation—Displacements of the Womb—Flexions—Membranes expelled during Menstruation—Pain in the Groin.

IN some women menstruation is a painless process. The flow comes unawares to them. This is probably the natural and healthy performance of the function. The greater number of women, however, suffer more or less discomfort—backache, headache, lassitude, and languor. In other cases, again, and they are by no means uncommon, the pain accompanying the performance of the menstrual function is severe. It varies in severity in different subjects; indeed, no two suffer exactly alike; the pain may be tolerable, or it may amount to the most excruciating agony. The pain comes on with the appearance of the discharge, and continues throughout the duration of the flow; or it may set in a few hours or a day before the discharge and then it reaches its greatest intensity about the time the discharge reaches the outlet, continuing for the first day or two, and then subsiding. The causes of this pain often elude our investigation. It is present when the flow is scanty, as well as in cases where it is abundant; when nothing unnatural is discoverable in the womb as well as when that organ is obviously diseased. There is no doubt that the cause varies in different cases. In some it is believed to be neuralgia of the womb; in others, congestion and inflammation; in others, obstruction to the flow and displacement of the womb; in other cases it is due to the formation and expulsion of a membrane; while, lastly, it may be due to disease in the neighbouring organs.

The pain is usually of a bearing-down character; it begins or centres in the bottom of the stomach, and spreads to the groins, loins, back, sacrum, and down the thighs. It is sometimes compared to the pains of labour. It is often complicated by urinary troubles, as frequent and difficult micturition, and forcing in the bladder, and with bearing down in the bowel.

Neuralgia is an affection of the nerves, and comes and goes by fits or paroxysms. Many parts of the body are subject to it, as the face, the loins, the left side, the back, the thighs, as well as the womb. It is sometimes a most agonising pain, lasting for a considerable time; at other times it is a piercing, darting, or lancinating feeling. When the womb is subject to it, it manifests itself only about the menstrual periods. The pain is not limited to the womb; the skin of the lower part of the belly and upper part of the thighs is tender, sometimes exquisitely so. The menstrual flow appears scanty at first, then more freely, and then relief is usually experienced; more commonly, however, the flow comes only scantily, and in gushes, then it stops altogether for a time, or is reduced to a mere stain; there is again a return of the pain, and another gush of blood follows. In this manner it goes on for a part or for the whole of its duration. After the flow

has ceased the patient recovers, to go through similar suffering with the return of the period. When this has gone on for some time, for years, the general system becomes affected. The patient becomes nervous and hysterical, suffers from flatulence, sickness, and obstinate constipation; has pains here and there over the body, headache, feels chilly, and is generally depressed both in mind and body.

It runs a protracted course, lasts for years. It is generally difficult to cure. Before the appearance of the flow, when the pain first sets in, a hot hip-bath should be used. The water should be as hot as the patient can bear, and she should sit in it for half an hour or an hour. Narcotics are given to relieve the pain, should it continue. They should be used as pessaries.

During the intervals the general health should be attended to. Bark and acids, cod-liver oil and iron, are often beneficial. Quinine in some cases does good. Constipation should be warded off by gentle purgatives, of which the mineral waters are the best. Fresh air, exercise, walking, riding, or driving, and early hours are valuable and necessary for recovery. Pregnancy will often, but not always, cure this disease.

The affection is sometimes seen in people of a gouty or rheumatic tendency. In such cases treatment should be directed to alleviate these conditions. Spasms of the wall of the womb are said to be associated with neuralgia. It is supposed that the narrow portion of the womb between the neck and the body becomes spasmodically contracted, and that at the time of contraction it retains the menstrual blood in the cavity of the womb, and when it becomes relaxed again the flow reappears in a gush. The treatment of this form is similar to that of neuralgia.

Congestion and inflammation of the womb are, as has already been described in treating of flooding, of frequent occurrence. They are often associated with inflammation in some of the tissues of the pelvis. The pain comes on several days before the appearance of the menstrual flow. The flow is at first scanty; after a day or two it becomes more abundant, but the pain continues more or less throughout. The discharge often contains small coagula of blood and shreds of membrane, or "bits of flesh," as they are often called by patients. There is pain in the back, bearing down, aching of groins and thighs, a tired feeling, lassitude, and often sickness. The womb is often tender on pressure, the breasts swell and become tender and painful, there is irritability of the bladder and bowels, and generally a yellow discharge—the whites.

Hot hip-baths are useful, leeches to the fundament or the womb; during the interval, injections of hot water; plain living, moderate walking exercise, regulation of the bowels, and rest.

Obstruction to the free escape of the menstrual discharge is another cause of painful menstruation; and it is, perhaps, the most common of all. Moreover, it is not only the most frequent, but it is also the most easily relieved. The obstruction may arise from a number of causes, such as constriction of some part or the whole of the canal of the uterus, displacement, or displacement and bending or flexion of the uterus, tumours of various kinds.

Painful menstruation arising from narrowing of the canal of the womb is said to be not uncommon. This condition may be the original condition of the womb, a



congenital one, or it may be acquired through the effects of inflammation after labour, or any injury. The pain due to it is severe. The discharge is scanty, escapes in gushes usually, each gush being accompanied by severe bearing-down pain, and followed by relief. There is backache, constipation, nausea, and vomiting; there is flatulence, and often tenderness over the lower part of the abdomen and groins. It is only possible to recognise the condition after a careful examination of the womb itself. It is not possible to make sure of it from the symptoms alone.

The object of treatment in such cases is to enlarge the canal of the womb, so as to make it sufficiently capacious to permit the easy escape of the menstrual blood. This has been effected by various means. Instruments called bougies have been passed along the canal of the womb through the narrow part. These should be sufficiently large to stretch it; sea-tangle and sponge-tents are used for the same purpose; or the opening may be enlarged by incision. These three methods are useful and suitable in different cases. The last is more permanent in its effects than the other two. Medicines have no effect on the condition in question, but still medication is often useful, because for a time the monthly sufferings of the woman give rise to constitutional disturbance, and bring on a train of symptoms similar to those described in the preceding paragraphs.

*Displacements of the Womb* frequently give rise to painful and also to profuse menstruation. In this place we will describe, as well as the true displacements of the womb, certain conditions which simulate them, and which are constantly mistaken by women for them.

The womb is liable to be displaced in various directions. Upwards, by tumours pulling or pushing it; there are no symptoms connected with this form except those arising from its cause. To either side, from presence of tumours, or the contraction of inflammatory products; these, again, have no peculiar symptoms or treatment of their own. One of the most common forms of displacement is downwards. It is called falling of the womb. But women frequently say they have falling of the womb, that the womb comes outside, when such is not really the case. They find a smooth body bulging out through the mouth of the vagina, and they conclude it to be the fallen womb. There are other parts, however, which may fall down and bulge out in this manner, and these frequently complicate true falling of the uterus. The wall of the passage or vagina may be turned out, and form a considerable tumour. The anterior wall alone may fall, or the posterior alone, or both together. When the anterior wall is the part thus affected, the condition is called cystocele; when the posterior with the intestinal wall, it is called rectocele. These two conditions we will first describe, as they are so frequently mistaken by women for falling of the womb itself.

The walls of the vagina are attached—the anterior to the bladder, and the posterior to the bowel—by very firm and close-uniting tissues. For this reason it is not easy for the wall of the vagina alone to become the subject of prolapsus or falling; yet occasionally this happens. The far more common condition, however, is for the wall of the bladder or of the bowel, or both, to participate in the fall of the vagina.

Whatever increases the capacity of the vaginal canal, or the dimensions of its walls, or the size of its opening, or renders their tissues loose and soft, may give rise to the conditions now spoken of. Of course, pregnancy and labour are by far the most common causes of such a condition. Pregnancy induces laxity, softness, and enlargement of the vaginal wall, and of all the tissues in its neighbourhood. Labour—the passage of the child—gives rise to immense distension of the canal, and frequently to tearing or laceration of the band of muscles around its orifice, and which forms the chief support of the vagina, the anterior portion of the perinæum.

The displacement may come on suddenly, or by violent efforts, by falls, straining, lifting, and by anything which calls forth violent muscular action. More usually, however, this affection comes on gradually. The person has had several children. She has not completely recovered after her later confinements. She has had a sense of weight in the parts, a bearing down, occasional trouble with the water, perhaps some difficulty in walking or standing long, but it has not been such as to attract particular notice. The womb has remained larger and heavier than it should be after labour, and the vagina more capacious or more relaxed; perhaps the perinæum has been slightly torn also. Another pregnancy and another confinement take place, and the consequence is that the fall of the vagina becomes marked. A portion of it is seen and felt in the shape of a round, smooth, soft swelling projecting through the vaginal orifice, and causes no little inconvenience.

Whites, or leucorrhœa, favour the production of this form of displacement. These discharges are rarely present for a long period without causing considerable relaxation of the vaginal wall and the parts around, and thus gradually pave the way for the falling of the part.

This condition is seen also in old people. In them the fat and padding around the vagina have been absorbed, the muscles are relaxed, the tissues are withered and wasted, they are unable to support the weight of the abdominal viscera, they yield, and the vaginal wall bulges out.

The symptoms of this affection are sometimes slight, sometimes severe in character. When the vaginal wall alone falls, there is a sense of weight and bearing down, a feeling as if something was coming away. There is a feeling of discomfort, and a difficulty in walking or standing. When the anterior wall of the vagina and the bladder are prolapsed, then there is in addition difficulty in micturition, the patient sometimes quite fails in her efforts to pass urine: she lies down, pushes the projecting swelling up, and then perhaps she can relieve herself. But even this expedient may fail; then the doctor is called, and the urine has to be drawn by an instrument. When there is difficult micturition the patient rarely empties her bladder entirely at any time. There is a little pouch of the bladder in the descended swelling which always retains a small quantity of urine; this decomposes, becomes offensive, sets up inflammation of the bladder; the patient now complains of pain, heat, forcing in the bladder, and scalding during micturition. By habitual care to empty the bladder completely, however, the condition last described may be avoided.

Instead of or as well as the bladder, the rectum or lower bowel may be dragged



down by the vagina. When this happens, the bowel is affected as well as the bladder. A pouch is formed just within the opening of the rectum, which bulges out beyond the surface. This pouch is liable to become filled with faecal matter. The bowels cannot be completely emptied. Irritation of the part is set up; inflammation in the lining of the membrane of the gut follows, diarrhoea may set in of a mucous character, or obstinate constipation and great dilatation of the rectum may result; bleeding piles and ulceration are not unfrequent consequences. These changes in the bowel cause the patient the most varied troubles; the pain from the piles and ulceration is frequently excruciating; hæmorrhage takes place from the bowel, and there is a constant desire to go to stool and a severe bearing down.

These diseases can be easily recognised when care is taken in the examination. They should never be mistaken for anything else. When there is a falling of the anterior wall of the vagina, an instrument should be introduced into the bladder, and this cannot fail to show whether the latter organ is prolapsed or not.

When the posterior wall of the vagina is prolapsed, the finger should be introduced into the bowel, and search be made for the pouch characteristic of prolapse of the rectum. If this be found—as it cannot fail to be if present—the diagnosis is certain.

*Treatment.*—The treatment of these conditions is of great importance. Every effort should be made to cure, and not simply relieve the condition. To effect a cure, a complete change in the condition of the parts must be brought about. This may in many cases be effected by rest, and applications in the form of injections or medicated pessaries. The applications used for this purpose are those which have a contracting or astringent action on the walls of the blood-vessels. They may be used in solution, and then are injected into the passage; or they may be used in the solid form, and in that case they are mixed with a substance which dissolves readily when exposed to a temperature of 99°, or blood heat. The substance most commonly used is cacao butter; others have been recommended and used, such as jellies; but none are so efficient as the cacao butter. The astringents used as injections are alum, lead, oak-bark, sulphate of zinc, tannic or gallic acid. All these are efficient in their turn. Any one of these should not be used for a prolonged time, because the parts appear to become accustomed to its action. It is advisable, therefore, to vary the preparations and drugs used when their use for a long period is necessary. These means, however, frequently fail, and others become necessary. Of these means instruments called pessaries are most generally in use. They are made of a variety of materials, and should be of the size and shape to suit the individual case. They should not be worn for any time without being frequently seen to. It is true that women often wear them for months and even years without suffering any great injury, but in many cases the injuries arising from such careless and reprehensible conduct is very great. A person wearing a pessary ought to have it seen to frequently at first, and when it is found to be suitable, it should be examined every three or four months at least. These instruments, however, never effect a cure. Once a pessary is used for this affection, it will have to be used for life. In some cases also it is not possible to construct an instrument which attains the object of retaining the part in

position. Such cases can only be treated by operation. Operative measures must be so devised as to meet the peculiarity of the case.

There is one other means which often gives great relief in these cases. It is the T bandage. The method of applying this useful support has already been described. It gives so much support to the perinæum, that it retains the parts from bulging out. The pad should be thick and well formed, so as to support the part uniformly and sit easily. Much may be done in this manner to relieve these troubles or affections without having recourse to an operation for their radical cure.

*Prolapsus of the Uterus*, or falling of the womb, is a disease frequently met with. It is usually seen in those who have borne children, but has been discovered in those who have not. It may come on gradually, or all at once. A very severe strain, or a sudden fall, or a fit of convulsions may be the cause of the affection coming on suddenly. In the great majority of cases, however, the cause acts slowly. The woman is a mother. She has had several children perhaps. The tissues supporting the womb have been relaxed and stretched at each birth for the passage of the child. After labour the patient has not the amount of rest necessary for the parts to return to their usual state. She has been obliged to get up too early, had to attend to the household duties. The result is a permanently relaxed state of the tissues supporting the womb. This is only one instance of the manner in which this condition of the parts may be brought about. There are other numerous causes, as want of food, over-nursing, a feeble constitution, &c.

Again, the perinæum may be torn during labour, as the head is born. The part is one of the chief supports of the vagina and womb, and any considerable laceration of it almost inevitably leads to falling of the womb.

Enlargement of the womb, provided it be not too large to descend through the pelvis, is another fertile cause of descent of the organ. This enlargement may be due to subinvolution, or a failure on the part of the womb to return to its normal state after labour, to inflammation and tumours of the womb.

Tumours in the neighbourhood may press it downwards, and the vagina may drag it downwards, but by far the most common are the conditions super-induced after labour.

It is met with also in old women, and in these cases the manner of its production is peculiar. In such cases the womb is usually small, it is atrophoid, its weight is small, for the organ is not much bigger than that of a child. In such people the fat which lies under the skin is absorbed, it disappears, and the skin becomes too large, loose, wrinkled. In a similar manner the fat around the internal organs is removed. The fatty pad found in the pelvis, around the vagina, bladder, appendages of the uterus, and the rectum, is removed. In this way the cavity of the pelvis appears larger, and as far as the uterus is concerned is actually larger, and as a consequence the womb descends.

The descent varies in degree. It may fall slightly only in the pelvis, or it may come down as far as the orifice of the vagina, and often it is found entirely outside, hanging down between the thighs.

The symptoms of this affection are by no means enough to characterise the



disease, and examination alone is sufficient for the diagnosis. Women subject to prolapsus generally complain of pain in the back. This pain is at the bottom of the back. It is a continuous dull aching. This is a very common symptom of uterine disorder. The whites is not a rare accompaniment of this form of displacement. The vessels leading to the womb, and the tissues around it, are constricted in consequence of the displacement, and the organ becomes congested and enlarged. Menstruation may be natural, but it is occasionally very profuse and painful.

The actions of the bowel and bladder are interfered with. There may be difficulty at stool or in micturition, and very frequently there is great forcing both in the bowel and in the urinary bladder.

Inability or difficulty in walking is another symptom in these cases. The patient may be quite unable to walk, or they can walk for short distances, but with pain and fatigue. Excessive fatigue after little exertion—fatigue in utter disproportion to the exertion made—is frequently complained of by those suffering from uterine troubles.

When the womb has been outside for some time the soft red mucous membrane covering the vagina becomes altered. The constant exposure, and the irritation to which it is subject, change its appearance and character. It becomes pale, harder, and more like the skin of the body. Ulcers also form on parts of it. These are sometimes deep and sharply defined. They are found in the situations most exposed to rubbing and other irritation. The neck of the womb itself is frequently the seat of one of these ulcers.

*Treatment.*—The womb should be replaced, and maintained in position. As a rule, there is no great difficulty in replacing the organ; but sometimes the difficulty in effecting this is extreme, and requires the greatest skill in manipulation. In replacing the womb the patient should be lying down on the side, or, better still, on the knees, with the shoulders low down, and then the protruding womb seized and gradually pressed upwards into its normal situation. In some instances it has been necessary to put the patient under chloroform, or some other anæsthetic, in order to attain this object. By this means all resistance, straining, and movement on her part are removed, and the muscles of the abdomen and chest are rendered lax, so that the object can be more easily gained. When the uterus has been replaced, the next object is to keep and maintain it there—to prevent its falling down again. This may be done in various ways.

In this connection a question of considerable importance arises, and that is the female dress. The clothes which women wear are supported by being tied round the waist. In some cases they are very tightly drawn around that part; but, fortunately, the absurd and wicked fashion of tight lacing no longer exists as in former days. But still, much mischief is done even now by tying the clothes round the waist in the manner usually adopted. The effect of this bad fashion is to increase the weight upon the lower wall of the belly. The intestines are pressed downwards upon the womb, and the perinæum and vagina have to do extra work. When this has been going on for years, and in favourable conditions, falling of the womb is necessarily brought about. The first thing to do, then, is to have the

clothes properly made, and instead of being tied round the waist, they should be suspended from the shoulders.

If the patient can rest on the couch, without walking or making any effort, and if the disease is recent, a cure can often be effected by appropriate treatment ; but if the disease is of old standing, and the patient cannot lie up, the means of treatment are palliative only.

There is another disease of the womb which simulates in many points descent of that organ—that is, elongation and enlargement of its lower portion, which is called the neck, or cervix. Cases of this are by no means uncommon. It occurs at all ages, in the married and in the single, in those who have had children and those who are barren. It is, however, oftener met with in married women. Women generally believe it is a true falling of the womb, and it requires a careful examination in order to recognise the true nature of the affection. The length of the elongated part may be such as to project at the orifice of the vagina, or it may only fill that passage like a polypus, or a foreign body. It is hard, smooth, and conical, with a hole at the most prominent part. The womb is longer and larger than usual. The woman complains of weight, bearing down, and discomfort in the bottom of the stomach. She is unable to sit without pain, the enlarged part being pressed upon. Whites are usually present. Menstruation is profuse, and often painful.

In some cases removal is the only effectual remedy. The operation is simple, and devoid of danger. When this has been done, the enlarged upper part of the uterus generally diminishes in size. In other cases, removal of the whole of the elongated part is not possible ; but a portion of it may be removed, and this is often sufficient to effect a cure. Before this is attempted, however, rest, with general and local treatment, should be tried. The general health should be regulated, and the tonic applications described under falling of the womb should be used. These all afford relief, if not a complete cure. When these fail, operative means should be resorted to.

*Displacement, with Change of Shape, or Bending of the Womb.*—These are called flexions of the uterus. The organ is bent or doubled on itself. When the bend is forward, it is called anteflexion ; when backward, retroflexion.

An inclination forward, with even a slight bend or curvature, is the normal position and shape of the womb in the virgin.

Flexion backwards, or retroflexion, is never a healthy and proper position of the womb. During early pregnancy the womb sinks in the pelvis, and is inclined slightly backward, but not bent in that direction. Later, as the womb grows larger, it loses that position, and becomes inclined forward, and maintains the latter position until the end of pregnancy. Slight anteflexion, as already stated, is a normal condition in the virgin ; when it, however, becomes marked, it is disease. It is not unfrequently met with in a marked degree in the single as well as in the married. Retroflexion, or bending backward, on the other hand, is a rare affection in young girls, but more common in those who have borne children.

The symptoms vary somewhat, according as the womb is bent forwards or backwards ; but they are not sufficiently distinct to distinguish one from the other. A careful examination of the womb itself can alone supply evidence sufficient for that.



Usually there is severe pain in the bottom of the back, bearing down in the pelvis, pain in the groins and down the thighs, dragging at the navel, pain at stool, painful micturition, or micturition may be difficult or quite impossible, and painful menstruation. The menstrual discharge is often profuse, sometimes amounting to a flooding. The discharge is clotty, and often comes away in gushes. The pains accompanying this function are sometimes like those of labour. When conception takes place, abortion is likely to follow about the third or fourth month. Conception, however, rarely takes place, and the majority of women suffering with this form of displacement are sterile. There is usually a white or yellow discharge between the menstrual epochs. The general health becomes affected, as it does, sooner or later, in most persons affected with disease of the womb. The appetite is lost, the digestion enfeebled, the blood becomes watery, nutrition imperfect, nervous symptoms now set in, and the patient ultimately may become hysterical. The pain in the back and pelvis becomes aggravated in walking or standing, and the patient is unable to walk. She consequently lounges about, and becomes a confirmed invalid. The causes of these forms of displacement are bad general health, want of tone in all the tissues of the body, congestion and inflammation of the womb, enlargement of the womb, pregnancy, labour, and abortion. Abortion is a very frequent cause, for the reason that it is too commonly regarded by women as an occurrence of but slight importance, and during the whole time they go about doing their household or other duties; or, if they are compelled to rest for some time, they get up before the womb has had time to return to its normal healthy state. Pregnancy in the poor is equally productive of the affection under consideration, for they are obliged to get up much before the time of complete involution of the uterus. Tumours of any kind pressing on or dragging the womb, as fibroid tumours, or osseous tumours, &c., give rise to flexions by their mechanical effects. Violent efforts, as in lifting, over-reaching, straining, vomiting, falls on the buttocks or pelvis, and tight clothing, may also bring on flexion. Many cases of flexion, however, are congenital; the womb was born in a bent state.

*Treatment.*—The object is to reduce the displacement and straighten the womb, and maintain it afterwards in its normal position. In some recent cases, and cases in which the displacement has been suddenly brought about by violence of some kind, simply straightening the organ and placing it in the normal position suffices to effect a cure. Such cases are, however, exceedingly rare. Usually, when medical advice is sought, the patient has suffered for months, or perhaps years, and the womb has become accustomed to its abnormal position; and in some cases inflammation has been set up around it, and bound it down by false membranes in that situation. When this is the case, when the organ is straightened and replaced, it immediately falls back again to the old position. Such cases are very difficult of treatment, and require a long time for recovery. The first object should be to replace the womb in its natural position. This is done by the hand if possible; should this be impossible, instruments have been devised for the purpose.

After the organ has been replaced, means should be adopted to retain it there. These are several :—

Rest. This, in many cases, is absolutely essential. The patient should remain

in bed, especially when there is inflammation around the displaced organ. If there be congestion or inflammation and great tenderness of the uterus, leeches and the treatment described under the head of inflammation may be called for.

While resting, the woman should lie on her face if she suffer from retroflexion, and on her back if from antelexion. Lying on the face is, as one would fancy, a rather irksome position; but by a little management and arrangement of pillows it may easily be rendered quite tolerable.

All pressure should be removed from the abdomen. When the patient rests in bed, of course this will follow in the course of things. When, however, she is up and about, it is far less likely to be the case. Women's clothes consist of heavy skirts supported by the hips. In some cases tight stays are often worn so tight as to produce evil effects, by contracting the lower part of the chest and upper part of the abdomen, thus giving rise to imperfect respiration and crowding of the intestines in the lower part of the body. This occasions pressure on the womb, tends to displace it, to maintain it in an abnormal position, and is unfavourable to its restoration to its normal situation. To avoid these, two things may be done, the clothes may be suspended from the shoulders, and an abdominal supporter should be worn. The clothes may, by a very simple arrangement, be slung from the shoulders, and in this manner the abdomen be freed from their weight.

An abdominal supporter should be worn with the view of taking the weight of the abdominal viscera from the uterus. It is especially useful to women when the abdominal walls are lax and yielding, as they so frequently are after repeated pregnancies. It should consist of a belt of webbing, with strong elastic let into it at the sides. The belt should fit tightly round the hips. To the part of it which goes over the lower part of the abdomen a broad pad, stiffened by means of cork or a thin sheet of steel, should be attached. The pad should be about four inches square, and should fit the lower part of the abdomen below the navel. These means—which have the result of the removing of the weight of the clothes from the abdomen, and the abdominal supporter—are found to give, in many cases, great relief. They are, however, not efficient to maintain the womb in its normal position. They simply relieve it from causes which act unfavourably upon it.

To maintain the organ in the restored shape, certain instruments called pessaries, to which we have before alluded, are necessary.

Pessaries, though great evils, are in many cases absolutely necessary; and when all other means have failed in bringing about a cure, recourse must be had to them. They are, however, not suitable in all cases, for they cannot be tolerated when inflammation is present; and until this is removed or mitigated their use is forbidden. Instruments of this kind are of various shapes. Some are introduced into the cavity of the womb, and allowed to remain there. These are called stems, or stem-pessaries. Others, again, are not introduced into the womb, but into the vagina only, and are made to press on the anterior surface of the organ, so as to raise and push the bent part backwards if the case be one of antelexion. Those for retroflexion are made to press on the posterior surface of the bent organ, so as to raise and push it forwards. Some of these are entirely introduced into the passage, and are retained there by their shape and the tonicity of the part; others, again,



are introduced in part only, and part of them remain projecting outside. The part in the vagina is made to press on the womb in such a manner as to straighten it and maintain it in position, while the part outside is attached to strings, which are tied round the body so as to maintain the instrument in its proper place. When these instruments are worn they should be frequently attended to. Every two or three months, at most, they should be taken out and changed, or re-introduced. Unless this precaution be attended to, serious injuries may result from too long-continued or too great pressure on one part, besides the tendency of foreign bodies, when introduced into any part of the body, to become foul and encrusted with a deposit.

*Membranous Dysmenorrhœa*, or menstruation accompanied by pain and the expulsion of a membrane, is not a very common affection. It is seen occasionally, and is supposed to be due to inflammation of the womb. The menstrual period returns, and is accompanied by a good deal of pain of a bearing-down character, and situated in the region of the womb—that is, in the lower part of the stomach; on the first, second, third, or fourth day a membrane is passed. It is usually called by women a piece of flesh, and has somewhat of that appearance. It is sometimes a complete sac, a mould of the womb itself. It is three-cornered, flattened, and flocculent on its surface. There is a little hole in every corner. The membrane may be passed, however, in several pieces, at different days of the flow, or even in small shreds. Some authorities assert that inflammation is the cause of this affection; while others doubt the presence of inflammation in some cases, but admit it in others. There is no doubt of the existence of congestion and enlargement of the womb in all cases. The pain comes on several days before the appearance of the flow. It is situated in the pelvis, the abdomen, the groins, and back. It is of a bearing-down character—somewhat like labour pains. There is forcing also in the bowel and the rectum. Strange pains in the abdomen and around the navel are sometimes felt. The pain gradually increases in severity until the membranes are expelled. After this event it abates, and even ceases altogether. The flow is at first in some cases scanty, but it increases until the membrane is passed, and immediately after is often very profuse and clotty. It occasionally lasts a week or ten days. During the intermenstrual interval the patient may be comparatively well. The membrane is expelled, as a rule, with every menstrual flow. Occasionally, however, a period may pass without a membrane. The disease sometimes appears to get well of itself. The membranes are not passed for months together, and then are passed again with every period. There can be little doubt that some cases which have been described as membranous dysmenorrhœa were cases of abortion. It is, indeed, difficult to distinguish early abortion from membranous sacs of dysmenorrhœa. It occurs at any age between fifteen and forty-five or fifty. It is seen in the married and in the single, in those who have had children and those who have had none. The condition, once it has set in, usually, but not always, entails sterility. There are some cases recorded where women who suffered from this disease became pregnant, and had happy confinements. At the same time this is rare. The continuance of the disease leads to general suffering. The whole body sympathises with the womb, every organ in the body becomes disturbed and fails in

the discharge of its functions, nervous symptoms set in, and may end in confirmed hysteria.

Membranous dysmenorrhœa is a most intractable disease. It is very difficult of cure, and when a cure has been effected it has been after long and patient treatment. Rest, physical and functional, is of the greatest importance.

The attack itself is to be treated by anodynes. Medicines which relieve pain, as opium, morphia, chloral, &c., are administered; during the interval an effort should be made to improve the general state, and to remove the local affection. The bowels have a great tendency to become obstinately constipated. It is with difficulty they can be regulated. The stomach is almost invariably disturbed—often there is vomiting, and the tongue is foul. Brisk purgatives are the best means of relieving the two conditions: Epsom salts, Carlsbad salts, Friedrichshall water, &c., together with attention to diet.

Tonics are often called for to improve the condition of the stomach and blood; bitters, as quinine, bark, and mineral acids.

*Ovarian Dysmenorrhœa.*—This is due to inflammation and other disease of the ovary. It is not uncommon. It may exist without any trouble in the womb, but it is frequently associated with uterine disease. What relation exists between the condition of the uterus and of the ovary, when they are present together, is uncertain. The pain comes on between the periods, sometimes several days before the appearance of the menstrual flow. When the flow appears, the pain, in some cases, disappears, while in others it lasts while the discharge is on. The pain is situated above the groin, and extends up the side and to the back. It is usually on the left side, rarely on the right. The pain is occasionally severe, and there is also great tenderness of the skin over that region, so that the patient cannot bear the slightest touch, not even the bed-clothes. Women sometimes imagine that a tumour forms at the seat of pain, for they observe that the part is occasionally swollen. This swelling can in many cases be easily recognised. It is worse when the pain is severest; that is, before and about the menstrual epochs. It is not due to a tumour, but to distension of the intestine with gas—to flatulence. It disappears and reappears again at the next flow. When the bowels are confined, the pain at stool is intense, sometimes so severe that the person faints. This pain is in the left side. There is often intense pain in the back and down the thigh on the affected side. It is aggravated by walking, driving, or riding, so that the patient in many cases is quite unable to take exercise, except that of the gentlest kind, as in a bath chair. It is very frequently accompanied by nervous symptoms. Vomiting is very common; hysteria by no means unusual. At first the nervous attacks appear only during or about the menstrual epoch, when the pain becomes aggravated, but after a time more or less prolonged they come on at any time. Any effort, mental or physical fatigue, or slight emotion, will in many advanced cases of the affection bring on a fit of hysteria. Exposure to cold during menstruation, and a rheumatic tendency, are said to give rise to it. A more frequent cause is pregnancy and labour. The treatment of such cases is attended with the greatest difficulty and anxiety. The general treatment is of the utmost importance, with a view to guard against the worst and most trying part of the affection, the nervous attacks.



Women who are the subjects of this disease are generally weakly and delicate, and no treatment can succeed which does not improve the general health. Warm clothing is necessary. Flannel should be worn next the skin—vest and drawers. The diet should be good, simple, nourishing. Fresh meat and milk should be insisted upon ; stimulants entirely interdicted. Exercise in the open air is absolutely necessary, in order to keep up the general health. When a patient is able to walk, it is better for her to do so than go in a bath chair or a carriage ; but in cases where walking is impossible, she should be taken out every day in a bath chair. Riding and driving cause jolting, and this gives rise to aggravation of the pain and of the diseased condition. Warm hip-baths are useful. They should be taken once or twice a week. Blisters to the painful part relieve the pain. They should be frequently repeated, and healed as quickly as possible. Other counter-irritants, as croton oil liniment and iodine, are used in some cases. Anodyne applications, such as belladonna plaster, chloroform liniment, &c., are frequently useful for the relief of the sufferings. Internally, tonics—bark, quinine, iodide of potassium and bromide of potassium, steel—acids, &c., are used. The bowels should never be allowed to become constipated, they should be regulated by saline or mineral aperients, for the certain consequence of constipation is great aggravation of the suffering.

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## CHAPTER V.

### THE WHITES—OFFENSIVE DISCHARGES—HOW TO USE INJECTIONS.

IN health the only discharge which takes place from the generative passages is the monthly discharge of blood, called the menses. Many women have a whitish discharge for a few hours before the appearance of the flow and immediately after its cessation, but this must be regarded as part of the menses ; while any discharge occurring at any other period is undoubtedly the product of disease either general or local. Discharges are of very frequent occurrence. Indeed, few women pass through life without at one time or another suffering more or less from discharges. They have received the name of “whites.” They are, however, of very different characters, have different properties, and originate from different sources.

Slight causes suffice in many cases to give rise to a discharge, as a chill, exposure to a draught of air, or change in the constitution of the atmosphere. The great majority of the diseases which affect the sexual system give rise to a discharge ; and such discharge may be poured out by the vagina, by the womb itself, or by parts situated in the pelvis outside the womb.

A pale white discharge is occasionally seen in young girls who are not regular, or in whom the menstrual discharge has not appeared at all. In these cases it returns monthly, at the times in fact when the menstrual flux should appear. It is in fact a sort of substitute for menstruation, a sort of “vicarious menstruation.”

In some cases the discharge is free and abundant, and consists of whitish or yellowish mucus; it lasts for two, three, or four days, then ceases, to return again at the end of the monthly interval.

Disorders or irregularities of the menstrual function, painful performance of it, increase in the amount of the flow, are frequently associated with a yellow discharge, which flows continually or at intervals.

Constitutional states may be the cause of whites. In scrofulous persons the mucous membranes have a tendency to become soft and somewhat swollen. The surface of the membrane not unfrequently becomes a little uneven—granular. This is very often seen in the mucous membrane covering the eye-ball. In such persons leucorrhœa is a by no means uncommon affection. It is also seen in the gouty, the rheumatic, and the consumptive. These forms of the disease are of a very obstinate and rebellious character. Inflammation of the genital passages, or any portion of them, is a not uncommon cause of this affection. In this manner inflammation of the vagina or of the womb may be the disease which must be cured in order to remove the accompanying discharge.

It is a matter of some importance to make out the exact source of the discharge, whether it comes from the vagina, from the neck of the womb, or from the body of the womb. It may have its source in any one of the situations named, or in all of them; the treatment of course will vary in some very important particulars, according to the part of the canal diseased; the treatment applicable to vaginal leucorrhœa is not applicable to that of the uterine cavity, and *vice versa*.

Debility, anæmia, or deficiency and poverty of blood, is a very frequent cause of whites. In this condition of the blood the whole body is effected. The blood being the source of the nutriment carried to the tissues, its constitution necessarily has a direct relation to the constitution of the tissues; and when the blood is deficient and the blood corpuscles few in number, the tissues will be insufficiently nourished, and in a state of relaxation. There is a tendency in these conditions to an excessive secretion from many of the glands of the body. The skin is frequently moist from the excessive action of the sweat glands. The mucous membranes are liable to pour out fluxes, and the genital canal pours out white discharge.

Disorders of the stomach and bowels are sometimes accompanied by leucorrhœal discharge. Indigestion, constipation, diarrhœa, or excessive distension of the abdomen give rise to it without there being present any evident disease of the uterus.

In many cases it arises from want of cleanliness, and improvement in this respect will be immediately followed by a diminution in the quantity of the white discharge. Leucorrhœa, as we stated when treating of pruritus or itching of the vulva, is a frequent cause of that distressing malady. It may also give rise to inflammation of the external organs of generation, of the upper parts of the thighs, of the vagina, and to sterility or barrenness. It may also in some cases be the cause of enlargement of the womb.

*Treatment.*—One of the first things that should be done is to observe the most absolute cleanliness. External washings and ablutions are not sufficient. The vagina or passage should be carefully washed out with warm water once or



twice a day. It is convenient to do this while in the morning bath, and while retiring at night. This is a most important part in the treatment of the affection. The further treatment must depend upon the exact nature of the case. Should the source of the leucorrhœa be the vagina, astringent injections will be useful. Should it depend on disease of the uterus, special local as well as general treatment will, in most cases, be required. When it arises from constitutional states, these should be treated. If there be a rheumatic tendency, warm clothing, efficient action of skin, &c., will be advisable. If gouty, stimulants should be avoided, exercise taken, and saline purgatives occasionally. If the discharge depends on anæmia, the treatment of that affection should be adopted. There are few cases where the object should be simply the suppression of the discharge; indeed, as a general rule, they should endeavour to remove the cause of it rather than simply suppress it.

Some women are rather fond of using injections of cold water and of astringent solutions. The practice in many cases is harmless enough; but every now and then they are used with very disastrous effects, for they set up inflammation in the abdomen around the uterus, cause intense pain, and render the person an invalid for months. Cold water, and astringent solutions of alum, tannin, oak-bark, lead, zinc, &c., should only be used when advised by a doctor, and when there is no congestion or inflammation of the parts. When the latter conditions are present astringents are injurious, and soothing fluids should be used, such as infusion of linseed or starch, or a weak decoction of poppy-heads. When the acute symptoms have been in this manner subdued and the case has become chronic, then the use of astringent injections is to be recommended. In many cases, however, it is found that the most skilled and varied treatment fails in its purpose of curing the disease and suppressing the discharge.

*Inflammation of the Vagina—Vaginitis.*—Severe inflammation of the vagina is a very painful, though not a very common affection. It arises sometimes from the injuries done to the vagina by the head in its downward passage during labour; from exposure to cold during the menstrual discharge; from injuries inflicted on the coats of the passage by the introduction of foreign bodies or injections, and it also occurs during fever.

The symptoms are generally very severe. There is intense pain or burning in the part; micturition is painful and scalding, it may be difficult or frequent; there is a sense of bearing down and of weight in the pelvis; violent throbbing; profuse discharge of yellowish matter having an offensive odour; the parts around the opening of the passage become red, swollen, the skin over them stretched, and the inner surface of the canal is intensely red, hot, and covered with matter. It is very tender, and not unfrequently slightly ulcerated. The vulva, or external parts, are excoriated.

In this form the disease lasts several days, or even two or three weeks; then the violent and pronounced symptoms just enumerated gradually decrease in severity, and the disease subsides into the form next to be described—chronic vaginitis. The inflammation occasionally extends into the cervix and body of the uterus, giving rise to a disease we shall describe later on, which is called endometritis, or an inflammation of the lining membrane of the uterus; it may even

pass up into the fallopian tubes, and through them as far as to the cavity of the abdomen, thus giving rise to pelvic peritonitis.

*Treatment.*—The patient should rest quietly in bed, and should avoid walking and movement as far as possible. The pain should be relieved by bathing with a decoction of poppy-heads, or hot water; hip-baths of hot water; injections of decoction of poppies, of starch, or of linseed tea, should be frequently made. After the injection, a pessary of opium or morphia should be introduced into the passage—especially if the pain be very severe. The bowels should be kept freely open by saline draughts, and the diet should be low and unstimulating, alcoholic drinks being entirely avoided. Abundance of diluent drinks, as barley water, linseed tea, and lemonade, should be taken, with a view to increase the quantity and dilute the strength of the urine. When the pain, swelling, and extreme redness have disappeared, and the disease has settled down into the chronic form, then astringent injections are of great use, as solutions of alum, acetate of lead, sulphate of zinc, &c. But these remedies, it must be remembered, should not be used in the first stage of the disease.

*Chronic Inflammation of the Vagina* is a very common affection, induced by very slight causes. It gives rise to a discharge of yellowish or whitish fluid, which is sometimes constant and profuse. This is not noticed, or, if noticed, not treated at first, and after a time it gives rise to discomfort and unpleasant general symptoms—headache, loss of appetite, depression of spirits, indigestion, nausea and sickness, lassitude, inability to walk a moderate distance, a sense of weariness or fatigue, and constipation. Along with the discharge little shreds of membrane are frequently shed, and sometimes even perfect moulds of the passage.

*Treatment.*—The general health must be attended to. Bitters, as bark or quinine, and acids. The bowels should be regulated; change of air is useful, sea-air and sea-bathing. Cold douches or cold baths; good and generous diet. The local treatment consists in the use of injections of warm water for cleanliness, and of acetate of lead, sulphate of zinc, tannin, alum, or some other astringent solution for constricting the vessels of the part, and to give them tone. Though the disease is frequently obstinate and rebellious, yet by perseverance, and by improving the general state of the health, a cure may generally be effected. The method of using injections will be given later on.

*Other Kinds of Discharge.*—Children occasionally suffer from a white or yellow discharge from the generative passages. It is of great importance to attend to this, for it gives rise to irritation, and the child may scratch or rub the parts for relief, and in consequence possibly acquire bad habits. It is seen in scrofulous, weakly children. Thread-worms occasionally give rise to it, and to intolerable itching of the part. It occurs also in acute fevers, as small-pox, scarlet fever, &c.

The first step in the treatment is cleanliness. The parts should be carefully washed with warm water two or three times a day. Having done this, they should be bathed with a little lukewarm Goulard water, and a strip of lint wet with the lotion should be placed between the parts. The child should be kept at rest. But this is not enough; the cause of the discharge should be removed. If the child is scrofulous or weakly, she should have cod-liver oil, steel wine, fresh air.



and good food. A search should be made for thread-worms in the motions, and if there be any present, injections into the bowel of salt-and-water, or of lime water, should be administered two or three times a week until none can be any longer found. At the same time steel wine, or some other preparation of iron, should be given.

When this form of leucorrhœa occurs in the course of an acute fever, the treatment of it should be deferred until the child is convalescent, when the means which have already been indicated should be had recourse to.

Besides discharges of mucus or of matter, a watery discharge occasionally flows from the vagina. This is profuse and abundant in some cases of pregnancy, and probably has its origin in the fluid surrounding the embryo. It passes out of the womb by oozing through, or by ruptures of the membranes enclosing the child. It occurs usually in advanced pregnancy, and may come away in gushes for a short time, or may flow more or less profusely for a considerable interval of time. It does not necessitate miscarriage, or interruption of pregnancy, but should pains like those of labour supervene, miscarriage or abortion will probably follow.

Again, in certain forms of abnormal pregnancy a considerable amount of watery discharge from the vagina is seen, such as those cases of false conception called hydatid, vesicular, or grape mole.

In certain diseases of the uterus such discharges are very abundant, as in cauliflower excrescence or epithelial cancer of the neck of the uterus. In such cases it is almost a clear watery fluid, or it may be slightly brownish. The amount discharged in this disease is sometimes very great.

Such discharges are also associated with cancer of the body of the womb, with polypus, and with fibroid tumours.

Occasionally an ovarian cyst discharges its contents into the womb or the vagina, and a profuse watery discharge follows.

After labour such discharges are also seen, and are due to imperfect involution, or to disease of the lining membrane of the uterus.

The bladder may open into the vagina by an artificial opening, and the urine escape involuntarily by the vagina.

*Offensive Discharges.*—The discharge from the vagina may have an offensive odour. In some cases it is exceedingly offensive—so much so that the patient is a burden to herself. There are several conditions which give rise to this peculiar condition. It has been thought that such discharges are met with in cancer only, but such is not the case. It is true that the discharge which flows from a cancerous ulcer and from cancerous growths of the uterus and vagina have frequently a very unpleasant odour, but cancer of these parts may exist not only without offensive discharge, but for a long time without any discharge at all.

The discharges caused by the presence of a polypus, however, may become offensive; indeed, any discharge from the vagina, whatever may be its cause, may become offensive if it be retained in the passages for any time. Such retention may be due to a small external opening, to constriction of the uterine canal by flexion or by fibroid tumours. Sometimes it will happen that the discharge is offensive without any discoverable cause.

Offensive discharges occur also during pregnancy, or after confinement. The embryo may die, and be retained in the womb in part or wholly for a considerable time, and may give rise to abundant discharge having an offensive smell. Or a miscarriage or abortion may have taken place, and a portion of the membranes and after-birth be retained, which, by undergoing decomposition, give rise to similar discharges. A portion of the after-birth may be retained after labour at full time, and cause similar symptoms.

These discharges give rise to much discomfort, sometimes on account of their quantity, sometimes from their offensive odour, sometimes from their irritating properties.

The quantity varies much. It may be so slight that a woman is scarcely conscious of its presence, and it may be so profuse that she has to employ two or three dozen napkins a day. When she stands up, after having occupied the recumbent posture for some time, it may flow in a stream from her.

The unpleasant odour of some discharges we have already spoken of.

The irritating properties of other discharges is occasionally very great. There is constant itching of the external parts, they may become inflamed, excoriated with small ulcers upon them. The skin around, and even the upper parts of the thighs, may be affected in this manner.

Besides the treatment of the conditions which give rise to these discharges (which has already been given) there are one or two observations which should be made here which will greatly conduce to the comfort of the sufferer, and in many cases hasten recovery. Absolute cleanliness is most important. Frequent ablutions with warm water. Injections into the vagina of the same fluid two or three times a day; when the discharge is offensive, a little Condyl's fluid or a little carbolic acid (a drachm to a pint) may be added to remove the smell. In this way will not only the evil effects of the discharge be to a great extent prevented, but the offensive odour will also be more or less completely removed. As soon as the discharge is secreted it is washed away, and has no time to become offensive by being retained within the passage.

*Mode of using Injections.*—A proper instrument should be used for injecting fluid into the vagina. Glass syringes of various sizes are sold for this purpose, but they are quite useless and worse, for they are dangerous. It has happened that a glass instrument has broken in the passage while being used. The proper instrument is an india-rubber "tube and ball." It should have a long gum elastic tube, with the openings in its sides for introduction into the vagina. The vaginal tube should have no opening at its point or end. A good syringe is that which is called Higginson's syringe. The patient should lie on her back with a vessel conveniently placed, so as to receive the injection as it returns from the passage. A nurse should administer the injection. If water be employed for cleanliness or other purpose, two or three pints should be used. It should be injected slowly, and no force employed.



## CHAPTER VI.

## SUBSTANCES EXPELLED FROM THE WOMB—MOLES, ETC.

SOLID masses are not unfrequently passed by the vagina. They are of various kinds, and to be able to recognise their nature one must be acquainted with the anatomy of the uterus and vagina, and of the human embryo. Frequently the aid of a microscope is necessary to distinguish their nature.

By far the most common substance thus passed is coagulated blood. This is often described as a "piece of flesh," "membranes," "like pieces of liver," &c. Clots of blood may be passed in the form of recent or of old coagula. In the former case they are generally of a dark or brown colour like liver, softish and easily broken down; in the latter, they may be pale, fleshy-looking, decolourised, and of firm consistency. Recent clots may be of any shape, usually having somewhat the shape of that part of the vagina in which they have been lodged. Old clots are generally formed in the cavity of the womb, and have a pear-shape—the shape the womb assumes as it becomes distended. Substances of this kind may be expelled by married or single women, mothers or virgins.

*Moles.*—These are the products of conception, and are of two kinds—the "fleshy" and the "hydatid," "vesicular," or "grape" mole.

The fleshy mole, as its name implies, appears like a fleshy mass, in which masses of coagulated blood are found. It is due to effusion of blood into the membranes of the embryo at an early period. Abortion does not take place, but the mass remains in the uterus, and remains in a more or less vital connection with it. It may be retained for several months, and then be expelled. The nature of the mass is known by the presence in it of traces of the membranes of the embryo.

The grape mole consists of a mass of small sacs about the size of small grapes, joined as it were like beads on a string. It is the product of conception, but the embryo dies at an early age, and the membranes develop into grape-like bodies. The woman usually believes herself pregnant, though she may think that all is not right. The abdomen grows very rapidly, much more rapidly than in healthy pregnancy. At the third month the abdomen may be as large as at the sixth month of pregnancy. There is a profuse discharge of watery fluid, often stained with blood; occasional bleeding; sometimes some of the small bladders are passed, and then the nature of the affection is clear. There is often bearing down, and pains like labour pains. At last the womb acts and expels its contents. The size of the mole varies. It may be only the size of an egg, but it may attain an enormous size.

When the condition is made out, the uterus should be excited to expel its contents.

Portions of the after-birth may be retained after labour, become organised, and

firmly attached to the womb, and ultimately be expelled. It may be regarded as a kind of mole or polypus. When expelled, its nature can be distinguished by the microscope, which would reveal the structure peculiar to the after-birth.

Membranes are sometimes passed from the vagina. These may be casts of the womb, as in membranous dysmenorrhœa, or they may be casts of the vagina itself. The latter are less frequently seen than the former. They are known by their shape, size, and structure. The former, when perfect, have a triangular, flattened shape, a shaggy surface, and with a hole at each corner; the latter have the shape of a flattened tube, have an opening at each end, the surface is shreddy, and marked with irregular elevated lines or ridges, characteristic of the vagina. The appearances presented under the microscope are distinctive. Of course, both these may be and are most frequently expelled in pieces, and not as perfect casts of the organs of which they are the mucous lining.

The treatment of the conditions which give rise to expulsion of membranous casts of the womb has been given under membranous dysmenorrhœa.

The cause of the shedding of casts of the vagina is as a rule the use of irritating injections. and when the employment of these is given up the trouble usually ceases.

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## CHAPTER VII.

PAIN IN THE EXTERNAL PARTS—INFLAMMATION AND ABSCESS—TUMOURS—BLEEDING FROM EXTERNAL PARTS—ITCHING AND IRRITATION OF—PAIN IN THE BACK, ABDOMEN, AND GROIN.

*The Significance of Pain.*—Pain in any part of the body is evidence of disease. It is presumptive evidence of disease of the part or organ in which the pain is felt; but careful inquiry often shows that though the pain is evidence of disease, it is often of disease of a distant organ; neuralgia of the brow is often due to disorder of the stomach, and pain in the ear to a diseased tooth. So the pains which owe their existence to disease of the generative organs may not be seated in the pelvis alone, but also in the thighs, the sides, back, &c. We have already discussed the pains which are so commonly suffered by women during the menstrual flow, and we shall make little or no reference to them in this chapter. Pain, however, is sometimes the only evidence of the presence of uterine disorder, and it is well to have some idea of the various pains which are called forth by diseases of the organs of generation.

*Pain in the External Parts—in the Vulva.*—The external parts possess a very high degree of sensibility. The membranes covering them—both the skin and the mucous membrane—are abundantly supplied with nerves, and these nerves are in great part nerves of sensation—capable of transmitting sensations of pleasure and pain. They are, moreover, supplied with an immense quantity of blood. In



certain states especially they become turgid and full. This is due to distension of the blood-vessels in their substance. These blood-vessels consist not only of the ordinary arteries, veins, and capillaries found in other parts, but also of great networks of veins, technically called plexuses. These veins are of considerable size, and join with one another on all sides, so that the tissue of these parts has in reality a structure which could be compared in some respects to that of a sponge. It possesses in fact a network of canals freely communicating with one another similar to that found in the sponge, by the filling of which with water the sponge becomes enlarged and swollen. It is not to be wondered at then that these parts should be subject to diseases of a very painful character. These diseases, or some of them, can be excited, or called to existence, by very slight causes. Very trifling irritation, an acrid discharge, or even any discharge from the passages, may call forth a painful inflammation or an intolerable and persistent irritation. Causes of so slight a character that they could not set up any disturbance or discomfort in many other parts of the body, when applied to these parts make themselves immediately known on account of the peculiar anatomical structure of the parts—their great vascular and nervous supply. These parts may be affected with any of the following diseases.

*Inflammation.*—Inflammation is a disease accompanied as a rule by considerable pain. This is especially the case when it attacks certain parts. Inflammation of the eye is accompanied by very severe pain, so is inflammation of the joints. The inflammation which accompanies gout, or which arises from an attack of gout, causes the most exquisite and severe agony. On the other hand, inflammation of the lungs is not very painful—though it is accompanied by great depression. Inflammation of the part now under discussion—the vulva—is a very painful disease. There are several kinds of this affection, as there are several kinds of inflammation affecting other parts. When inflammation affects the surface of a part and structures beneath (for it rarely affects the superficial textures alone), and causes matter to be formed abundantly on the affected surface, it is called purulent. The term is taken from the word pus, the technical name applied to the discharge called matter—such as that which is discharged when an abscess is opened.

In many situations in the body, again, there are small glands in the shape of little vesicles or bladders buried in the tissue, but causing as a rule a slight projection on the surface. These are called follicles. They are found in many places, especially on mucous surfaces. They may be easily seen on the inside of the lips or cheeks, in the throat, on the tonsils, and they are found also on the mucous surface of the vulva.

In certain cases these parts become inflamed, and this form is called follicular inflammation.

There is another form of inflammation not so frequently met with in these parts as the purulent and follicular, which is called the gangrenous. It is seen attacking the face of children occasionally, and is then called *cancrum oris*, or *noma*.

Inflammation of the vulva is technically called *vulvitis*. The parts become red and painful. At the same time they begin to swell. Heat or a sensation of burning is felt in the part, and they are hot to the hand. They soon become

covered with purulent matter, but at first when the disease sets in they are dry. The pain is severe; in some cases there is intense itching of the part, and it is difficult for the patient to restrain herself from rubbing or scratching them; but when this has been done it brings no relief, and, moreover, it increases the irritation. The matter discharged has usually, if not always, an offensive smell. It is of an acrid and irritating character, causing inflammation of the parts it comes in contact with. The greatest care should be taken that none of it be brought in contact with the eye, whether it be by means of the hands or towels used, because it would inevitably give rise to a form of ophthalmia of a most destructive character.

The vulvitis frequently extends to the neighbouring parts. It may extend up into the urethra, the passage leading from the bladder, along which the urine is passed. When this happens, micturition becomes painful. It is accompanied by heat and scalding. It becomes frequent, and often there is much straining. When it extends beyond the urethra into the bladder these symptoms become more severe. There is constant desire to urinate. The act is exceedingly painful. The urine is thick, and contains masses of a jelly-like character—the mucus of the bladder containing a deposit of urinary salts. The inflammation may also extend up into the vagina, and then we get vaginitis and its symptoms. These we have already described. The fever accompanying these affections varies according to the extent of surface involved and the acuteness of the attack. If the attack is slight, and affects a small portion of the vulva only, there may be little or no fever. Should the whole of the vulva, however, be affected, and the inflammation extend into the urethra, bladder, and vagina, there is great heat of skin, thirst, and general fever.

This affection should be treated actively from the first. It is of the utmost importance that the diet should be regulated, and that all the functions of the body be carefully supervised. The patient should rest entirely in bed. Walking or moving about irritates the parts and aggravates the inflammation. It causes the matter discharge to come in contact with the thighs, and excites inflammation in those parts. The bowels should be acted upon freely by saline purgatives. Epsom salts is one of the best. The urine should be rendered as dilute and little irritating as possible by the administration of alkaline drinks and barley water. It is of great moment to render and keep it neutral in reaction. The diet should consist of slops. No spirits, or wine, or malt liquors should be taken. The inflamed parts should be frequently bathed with warm water, or a decoction of poppy-heads. This should be done every four or six hours, and during the intervals poultices of linseed-meal or hot fomentations should be applied. When the violence of the inflammation has passed away, the diet may be improved, purgation is no longer necessary, and the frequent bathing and poulticing should be given up. Then cleanliness, bathing the parts with warm water, or Goulard water, two or three times a day, and an application of lint wet with a lotion of acetate of lead, will as a rule effect a cure. Should this fail, more astringent applications may become necessary. In obstinate cases many remedies will have to be tried, probably, before the one suitable to the case is discovered.



Gangrenous inflammation is fortunately not of frequent occurrence. It is a terrible disease. It frequently ends in death. It is seen in children, and is due in the large number of cases to blood-poisoning in some form or other, as fevers of all kinds.

The parts become swollen, purple, dark, and black. Mortification soon sets in, and the parts become extremely offensive. The disease extends, and the patient often succumbs.

The treatment should be active, in order to support the patient. The most nourishing food in the most digestible form—wine, brandy, ammonia, bark, and other stimulants should be freely given. The putrefying part should be absolutely destroyed by means of a caustic. It should be entirely destroyed, and in order to ensure the destruction of the whole of it a portion of healthy tissue should be included. The means generally used for this purpose are the actual cautery or the strong, fuming nitric acid—the aqua fortis. Warm poultices of linseed-meal, or poultices sprinkled over with charcoal, to destroy the smell, should be constantly applied.

*Partial Inflammation and Abscess of the Vulva.*—Inflammatory action having begun in the external parts may become general, as above described, or may be limited to a greater or less portion of those parts. It affects not the surface only, but the deeper structures. The deeper parts may alone or chiefly be involved, the surface becoming red only in consequence of the mischief in the deeper structures. In this case the inflammation is said to be circumscribed. The first notice of anything wrong is given by a pain and a pricking sensation in the part, then swelling takes place, which soon becomes hard and very tender. The swelling is limited to one side, and is large enough to almost close the opening. There may be difficulty in micturition, arising from the same cause. After a time the hardness disappears, and the tumour becomes softer and softer. The hard substance has now become a fluid mass—matter is formed. As soon as matter is formed it should be allowed to run out from the body, and in all cases, when possible, a way should be made for it if necessary. People have usually a great horror of the lancet, not only on account of the exquisite pain which it causes, but also from a prejudice that it is a practice fraught with evil, and that it is better for the matter to find its own way to the surface, or be drawn there by poultices. It is true that the pain arising from the use of the lancet—on account of the inflamed and sensitive condition of the part to be divided—is exquisite; but it must also be remembered that it is momentary only. The operation, if it deserves the name, takes but an instant, and the relief which follows is not only instantaneous but permanent. The moment that the distended sac which is filled with matter is opened the pain ceases, and the patient is in comparative comfort. The prejudice in favour of poultices, and the belief in their power of drawing matter to the surface, is without foundation. There is no basis for it, general as it appears to be. Poultices are useful in a very great number of cases where there is local pain, on account of their power of relieving pain. The warmth and moisture which they contain favours the circulation in the part, and this alone is their action, and it depends on their power of retaining for a long period moisture and heat. The best poultice is that which remains hot for the longest period without becoming dry. Poultices then, or any

other external applications, have no power to attract matter to the surface. This can only take place naturally, by the formation of more matter and the destruction of more tissue. This is always accompanied by a good deal of pain. It is also usually a very slow process. Moreover, when the matter has thus reached the surface, and the skin has given way and the abscess is discharged, the work of recovery is greater, slower, and more prolonged than if the abscess had been opened at an early period, as soon as matter was formed, and when it was small in quantity. Besides, recovery is not only more tedious after the natural discharge of abscesses, but it is also, as a rule, less perfect. The cavity of the abscess is liable not to close entirely, and a canal, or sinus, or fistula remains, which continues to discharge a thin, often irritating, unhealthy kind of matter. The difficulty of curing such a canal is often very great. Its walls are thick, hard, and grisly; they pour out an unhealthy discharge. It is difficult to get them together and to make them unite. Their vitality is low, and the difficulty often is to alter their character and bring about a cure. Such are not unfrequently the results of allowing an abscess to open naturally, which, had it been opened by the knife or the lancet as soon as matter had been formed, would have probably been well before the natural opening had been effected.

*Tumours of the Vulva.*—Cysts are not unfrequently met with in this situation. They vary in size considerably. They frequently cause no inconvenience, and remain unobserved. This, however, occurs when they are small only, for when they attain any size they form a swelling which draws the attention, for they partially occlude the orifice of the passage. These cysts are not usually painful. They may, however, become inflamed, then the pain of them is severe, and abscess may form. When, however, inflammation is not present, they give rise to nothing but inconvenience on account of their size. They should be carefully distinguished from abscess, for the same method of treatment cannot be adopted in the two cases. The distinction is easy. The history is sufficient. The pain, heat, tenderness, and redness of the early stages of abscess are not met with at any time in the history of cysts; and, as a rule, cysts are discovered accidentally, whereas abscess commands the attention from the first.

The treatment of cysts must be operative. They may be dissected out, or opened. When opened, the substance in them is sometimes a thick, viscid, pale, transparent jelly; at other times, a substance of a similar consistence, stained with blood, or it may be a thin sanguineous fluid only.

Enlargement or hypertrophy of the parts themselves. Any one part of the external organs of generation may be the subject of enlargement. The part then looks as if it were swollen, but is not red nor tender, and it is free from pain. It may have its natural consistence, or it may be harder than usual. They may be seen in children—that is, children are born occasionally with such an affection. The treatment when necessary is operative. There are no other means which can be effective.

Warts are also sometimes seen on these parts. They cause a good deal of irritation and trouble. A discharge of a watery character flows from them, and they often bleed.



*Treatment.*—Removal by operation.

*Tumour of the Orifice or Meatus of the Urethra.*—The orifice of the urinary passage is not uncommonly the seat of a growth which causes the patient the most refined torture. This tumour or growth is a red vascular swelling on the mucous membrane of the opening of the urethra. It is usually small—it may be as small as a hemp-seed, or as large as a cherry. It is usually attached close to the tissues beneath, but occasionally it has a longish stalk, half an inch or more in length. It is of a dark red appearance, is rough or uneven on the surface, lobulated. It is soft to the touch, and very tender; it bleeds easily, and breaks down with great readiness.

The patient complains of the severest pain in passing urine. They describe this pain in the strongest language, and postpone the act until compelled to it by dire necessity. It is easily recognised when looked for. Touch alone will give rise to a strong suspicion of its presence, on account of the excessive and unnatural tenderness in the situation of the urethral opening, but ocular examination puts the diagnosis beyond doubt. The tumour is seen, and its character recognised.

*Treatment.*—It is often troublesome to cure. The symptoms can be often greatly relieved by medicine. The pain can be relieved, and micturition rendered tolerable; but the worst troubles soon return again. The application of anodynes, as opium, aconite, hydrocyanic acid, chloroform, can only be palliative in their effects. For a cure to be effected, extirpation of the growth is necessary. This may be done by direct removal or by caustics. It depends a good deal on the form and position of the tumour which of those means is most suitable to the case. Even when apparently completely removed, the growth occasionally returns again. In such a case the operation for removal should be repeated.

*Bleeding into or from the Vulva—Pudendal Hæmorrhage.*—This is by no means a common affection. The blood may flow into the tissues of the vulva, and there form a soft swelling—a sanguineous tumour; or it may flow till the surface of the skin be lacerated. It is more common in the married than in the single. The veins during pregnancy often become enlarged, hard, and swollen both in the lower limbs and in the private parts, from the pressure upon them preventing the easy and rapid flow of blood. In consequence of this, the veins give way, and hæmorrhage follows. Muscular efforts, by causing a great strain upon some of the veins, produce a similar result. Blows on the part, produced by falling, riding, &c., may cause such laceration and bruising of all the tissues as to give rise to profuse bleeding. Wounds of the part, produced accidentally or otherwise, are another cause.

When the blood is poured into the tissues, and does not appear externally, and when it is produced by no external injury to the parts, there is pain, pricking, and perhaps throbbing, in the part, and a swelling forms usually very rapidly. The swelling sometimes becomes very large in a very short time, and may prevent micturition.

The *treatment* consists in the application of cold and pressure. Cold should be applied by means of evaporating lotions or a bladder of ice, pressure by means of a T bandage and a pad. A T bandage consists of a belt surrounding the abdomen just above the hips. It should be applied moderately tight, so that it cannot when

pulled slip over the projecting wings of the pelvic bones. When this is applied, another bandage is passed between the legs, and fastened posteriorly to the abdominal belt; then it should be fastened to the abdominal belt in front when drawn so as to produce the pressure required on the vulva. By such means most superficial bleedings from these parts can be effectually checked. When the tumour formed by the blood is small, rest and time will generally suffice for the cure. When bleeding has stopped, absorption will set in, and rapidly carry away the extravasated blood. Should the sanguineous tumour be large, however, operative measures would be required for the removal of a clot of blood that could not be carried away by the absorption process, and the greatest care would then be requisite in the after treatment.

Other tumours of the vulva are occasionally met with, but they are of such rarity as not to require description or enumeration in a work of this kind.

*Itching and Irritation of the Vulva—Pruritus.*—Itching of the vulva is a most distressing and intolerable affection; and it deserves this special character because to all appearance the patient enjoys perfect health, and yet at the same time she suffers from an itching so intense, an irritation so acute, that she is debarred from society by the ever-present desire of scratching the part to relieve her trouble; loses her sleep from the same cause; is constantly troubled night and day, until at last her general health suffers. The itching is only a symptom of some deeper affection, and in order to effect a cure the cause must be discovered. The causes of this symptom are various. Not unfrequently it is the result of a disease of the skin covering the part. The cutaneous surface may have scattered over it small pimples having a red top. These may be the original cause of the irritation, but they may also be the result of the itching, and the scratching and rubbing exercised to relieve it. Eczema is another affection of these parts, and not a very uncommon one, which excites intense itching. It begins as little bladders, with a red border or base. These burst, the skin around becomes red, and after a brief time may become a moist weeping surface. The surface has now a red, shining appearance, and is intensely irritable, and sometimes very painful. It is occasionally hot and burning. This acute state may soon pass off, and a chronic stage follows, which often lasts an unlimited time. During the continuance of the chronic condition, successive acute attacks may occur, successive crops of vesicles making their appearance, and running the course already described, leaving the patient generally in a worse condition than before.

It is a very obstinate disease, very rebellious to treatment. The acute, hot, burning condition may be relieved by the application of a mixture of lime water and oil. This should be applied frequently on strips of lint, and the patient should be kept absolutely at rest. All stimulants should be avoided, and the diet should be moderately low. Great cleanliness should be observed. Ordinary soap should not be used in washing—tar or carbolic soap should be substituted. A regular course of treatment will be necessary to establish health. Treatment must be persevered in for a long time to effect a cure.

But pruritis is more frequently met with without any apparent disease of the skin. It appears that the skin is in these cases the seat of an irritation reflected



from other parts. The terminations of nerves are often the seat of the irritations arising in their course. When the skin is to all appearances healthy, we generally find a discharge of some kind, often of an irritating character, from the vagina.

The whites and all the diseases which give rise to them are a prolific cause of pruritis; indeed, this is of all the most frequent. This disease, though exceedingly common, does not, however, give rise to pruritus but in a few cases. It does so when the discharge possesses a very irritating character. Pregnancy is frequently accompanied by a profuse leucorrhœa, and these cases are more subject to pruritis than those in which leucorrhœa is present in the unimpregnated condition. Pregnancy in itself, however, exercises such peculiar influence on the whole system—nervous, cutaneous, digestive, and so on—that it is not easy to say how much is due in such cases to the pregnant state, and how much to the whites accompanying it.

In old age pruritis is also met with, arising from whites. The irritation caused by thread-worms in the bowels gives rise to the most intense itching, which cannot be alleviated until the offending organisms be destroyed.

*Treatment.*—Whatever be the cause of the itching and irritation, every effort should be made to relieve this most distressing symptom, and that at once. Relief of this is in the highest degree demanded, because it unfits the patient for all her duties and for all the pleasures of life. At the same time that the most prominent symptom should be treated and alleviated, the cause of the evil should be traced out. Examine carefully for all the conditions which are likely to cause such symptoms. Should there be leucorrhœa, the greatest cleanliness should be observed. Frequent ablutions with tepid water, or water containing a little Gonlard water, should be practised. Injecting into the vagina of similar solutions of lead should be practised at the same time. When the parts have been dried by means of a soft towel, the itching parts should be oiled or greased with lard or sweet oil, or powdered with starch and oxide of zinc. Should disease of the vagina or of the uterus be discovered, it should be treated, and the itching meanwhile relieved by poppy-head fomentations, opium, or the application of a solution of nitrate of silver to the surface.

*Pain in the Back.*—In almost all diseases of the womb this is complained of. It is situated in the lower part of the back, and is at its height during menstruation. It may arise from other causes, as constipation, lumbago, and disease of the spine.

*Pain in the Pelvis and Lower Part of the Abdomen.*—This arises from many causes, as fibroid, tumour, cancer, or inflammation of the uterus. It is more or less constant. The pain of cancer is peculiar, it is described as having a darting, burning, lancinating, or gnawing character. Pains which are intermittent, which come and go, and which have more or less the character of labour pains, are caused by retention of the menses, abortion, hæmorrhage around the womb (hæmatocele), polypi, clots, or fibroids in the womb, flexion of the uterus, membranous dysmenorrhœa, neuralgia of the uterus.

*Pain in the Side a little above the Groin.*—This is often due to ovarian irritation or chronic inflammation of the ovary. It is also said to be due to

neuralgia of the ovaries. It proceeds to the back and hips, and down the thigh and leg of the affected side. It is sometimes very severe, and is attended by superficial tenderness. Walking or any movement aggravates it—especially jolting movements. It greatly interferes with walking, and gives rise to great fatigue. Displacements of the uterus, displacement of the ovary, congestion and inflammation of the womb, and disorders of the bladder, are said to give rise to similar pain. The pain is usually situated on the left side, occasionally on the right, and now and then on both. The pains occurring with menstruation have already been described.

*Sometimes a sudden intense pain is felt* in the lower part of the abdomen. It is accompanied by prostration, a feeling of faintness or actual fainting, pallor of the surface, weakness of the pulse, clammy perspiration, sickness, and vomiting. These are symptoms of a severe shock to the system, and are always serious. They should at once be properly attended to. They may be due to rupture of a vessel in the tissues around the womb and hæmorrhage (see “Hæmatocele”), or to rupture of the pregnant uterus, to hæmorrhage from an abnormal form of pregnancy called extra uterine (this is extremely rare), to rupture of an ovarian cyst. Rupture of the pregnant uterus is very rare. It may happen without obvious cause.

Rupture of an ovarian cyst happens occasionally. Sometimes it results in a cure, and sometimes it ends fatally.

The treatment, until advice is obtained, should be absolute rest, and small quantities of stimulants, of which brandy-and-water is the best.

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## CHAPTER VIII.

### DISORDERS OF MICTURITION.

DISORDERS of micturition frequently accompany uterine and ovarian disease. This has already been observed when enumerating the various symptoms which accompany diseases of the organs of generation. In this chapter it will be necessary to do little more than to enumerate the causes of urinary troubles, so that the reader may be able to refer to those causes in other parts of the work.

Micturition may be frequent, but accomplished without pain or difficulty. These cases are very common. They are due to displacements of the uterus, tumours in the pelvis pressing or irritating the bladder; inflammation of the uterus or of any of the parts in the pelvis, as pelvic cellulitis; hæmatocele; dysmenorrhœa; irritability of the bladder, without any special disease; certain conditions of urine, and some diseases of the kidneys.

On the other hand, micturition may be frequent and painful. This depends upon displacements of the uterus pressing on the bladder and urethra; vascular tumour of the urethra; inflammation of the vagina and external parts, and of



the urethra and bladder; gravel, stone in the bladder; disease of the kidneys; diseases of the bladder; and certain conditions of the urine.

Micturition is sometimes difficult. This may be due to displacements of the uterus; tumours in the pelvis; displacements of the bladder, as in falling of the womb; tumour of the urethra and vulva or external parts pressing on the urinary passage and diminishing its calibre; stricture, or constriction, of the urethra, or urinary passage; and diseases of the bladder, as cancer, polypus, paralysis, &c.

Micturition is impossible in some cases. Rarely no urine is poured into the bladder, and there is no desire to micturate. This is called suppression, and is due to inaction of the kidneys. In the majority of instances, however, the urine is freely secreted, and finds its way into the bladder, and though the patient makes efforts to urinate, she fails; this is called retention. This condition is due in most instances to obstruction to the passage from pressure caused by tumours, or displacement of the womb. It is also seen in some cases of hysteria. In the last-named class of cases a good deal of pain is complained of in the bottom of the stomach, as well as in other parts of the body. The attacks come on frequently, and are due to a nervous condition. The exact nature of the case can as a rule only be made known by examination.

Micturition is sometimes involuntary. This condition is not very uncommon, and is one of the most distressing affections. It may be present at birth, but this is rare. Young girls frequently are unable to retain their urine during sleep. This condition is generally easily cured by careful watching, and by regulating the action of the urinary function. When the girl goes to sleep, she should be made to pass urine. She should again be called up to micturate once or twice, as may be necessary, in the course of the night. The time when the involuntary action takes place should be found out by careful watching, and the calls to urinate should be made just before such times. In this way the habit may be broken, and a better one substituted.

But micturition may be involuntary from defective formation or from disease of the bladder. The most common of these conditions is a fistula, or a communication between the bladder and vagina. In most of such cases the person has no control whatever over the flow of urine; while in others she has partial control, because while at rest in certain positions the urine is retained for a shorter or longer time, according to the position of the fistula. As a rule, this is the result of severe labours, in which the partition between the bladder and vagina becomes torn through, or crushed to such a degree as to end in ulceration. The fistula is easily discovered on careful examination. There is but one means of cure—that is, an operation for closing the opening. No other treatment can be effectual. Fistula may also be the result of cancer. For this no operation can avail.

Involuntary flow of the urine may result also from pressure caused by tumours of the ovaries, or of the uterus, or of other parts, when they enter the pelvis.

Displacement of the uterus is also an occasional cause of incontinence, especially during pregnancy.

During the later months of pregnancy and after labour, the urine escapes often

in an involuntary manner; after labour the condition passes off, and control over the bladder is regained as health and strength are restored.

When there is involuntary escape of the urine, the greatest care is necessary in keeping the parts clean. It is not possible to keep them dry, owing to the constant dribbling. This gives rise to irritation, redness, pimples, or inflammation of the skin and buttocks. To ward off this, warm bathing of the parts should be had recourse to once or twice a day, and after each bath the skin should be perfectly dried and smeared with lard or zinc ointment. It is hardly necessary to say that the diapers should be frequently changed.

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## CHAPTER IX.

### ENLARGEMENT OF THE ABDOMEN—OVARIAN TUMOURS.

THE abdomen may become enlarged from a variety of causes—as pregnancy, dropsy, tumours of the ovary or of the uterus, diseases of the spleen, kidneys, liver, and bowels. Of pregnancy we shall speak at length in another section. Here we shall speak of tumours of the ovary, and refer incidentally only to the others.

*Tumours of the Ovary* may be solid, cystic, or cancerous. The solid tumours are rare, and never endanger life. They do not grow to a large size, and usually cause but little inconvenience.

*Cancer of the Ovary.*—The tumour is situated on the right or left side, between the navel and hip, in the region of the ovary. It is the seat of pain of a lancinating, darting, or burning character. It is tender to the touch, liable to press upon the veins which return the blood from the lower limbs, impede the circulation, and give rise to a puffy swelling of the leg. The patient loses flesh, grows rapidly weaker, becomes irritable, fretful, and depressed in spirits. The tumour usually forms rapidly, and is irregular or lobulated on the surface, though in some cases it is smooth. In course of time the peculiar aspect of cancer is developed. The abdomen may become immensely distended with fluid—dropsy. This is due to the irritation caused by the cancerous mass. Such great exudation of fluid into the cavity of the belly never occurs in any other disease of the ovary. This is a valuable aid in diagnosis. The treatment depends on the character of each individual case. In one it is advisable to remove the growth by operation, with a view to prolong life, though perhaps not to absolutely cure: in another such an operation is impossible.

*Cystic Tumours of the Ovary, or Ovarian Dropsy.*—These are sacs or cysts containing fluid. Sometimes there is but one cyst present, and that a simple one, containing a single cavity only. In other cases, a cyst contains a number of cavities distinct from one another, or several smaller cysts within itself: such a tumour is called a multilocular cyst. In a third class of cases, several cysts grow side by



side ; they may unite and form a single tumour, or they may remain more or less separate.

The contents of the cysts vary in character. They may consist of a pale, straw-coloured fluid, almost like urine in appearance, or of a thick, viscid, gelatinous substance, which may have a pale, or a brownish, or even dark colour. In some rare cases, skin, bone, hair, teeth, and fatty matter have been found within ovarian cysts.

We know but little of the origin and causes of these morbid growths. They are rare under twenty, most common between twenty and forty. At the same time they have been seen in youth, and even in childhood, nor is old age exempt from them. Child-bearing is generally believed to prepare the ground for their development : but as the great majority of women are or become mothers at some period of their lives, this belief has little in its favour. Moreover, it is not uncommon to see cysts of the ovary in the unmarried and childless. General weakness, bad nutrition, general pallor, or chlorosis, are said to predispose to the formation of these cysts. In favour of this, it may be said that the majority of the subjects of this form of tumour are out of health. Scrofula again appears to favour their development. Disorders of menstruation frequently accompany and precede the growth of ovarian tumours, and are said to favour their development. In these cases, however, it is more likely that there is something radically wrong with the generative organs, and that the menstrual disorder as well as the ovarian growths are due to the same cause, than that the menstrual disorders bear a casual causal to the ovarian tumours.

*Symptoms at the Beginning of Ovarian Tumours.*—There are usually few if any symptoms which attract attention. In some cases menstruation is disordered, but this symptom is of so common occurrence where ovarian disease is not present, that it would not lead to the least suspicion of the existence of ovarian dropsy. Again, in other cases where cysts grow in the ovary, menstruation may be performed regularly and normally ; and pregnancy may even occur, and run its course to a happy termination. In many cases, however, soon after the commencement of the disease there is a dull pain felt in the region of the affected ovary, a sense of fulness, weight, dragging, and irritation. There may be a slight swelling—smooth, resistant, but not tender—discovered on careful investigation. So long as the tumour remains in the pelvis, it may give rise to very serious troubles by its mechanical effects. It presses on the bladder, giving rise to frequent or difficult micturition, or even renders urination impossible. On the other hand, the pressure exercised by it on the rectum or bowel gives rise to constipation, or alternately diarrhœa and constipation, and bleeding piles. Pressure on the blood-vessels causes swelling of the lower extremities. When the tumour rises from the pelvis into the cavity of the abdomen, its presence is more likely to attract attention. The symptoms above enumerated are present only when the organs in the pelvis are seriously pressed upon by the tumour. In some cases this does happen, but the tumour readily ascends into the cavity of the abdomen without the occurrence of any such troubles. In that case the growth may attain a considerable size before its existence or the existence of anything wrong is suspected. Its discovery is in

some cases accidentally made by the patient or by her doctor. In other cases, there is a consciousness of abdominal enlargement; there is a sense of fulness, and the clothes are felt tighter than they should be. At first, the swelling or tumour is situated on one side. As it grows, however, it extends upwards, and towards the middle line of the body, and ultimately extends across that line, filling both sides. These tumours vary much in size: they may reach up to the breast-bone, filling the whole of the abdominal cavity, driving the intestines upwards and backwards, and encroaching upon the cavity of the chest. On the other hand, they may be so small as not to be discoverable on the most careful investigation made during life. They are at first movable, and may remain so throughout their course; but in most instances they set up inflammation in the cavity of the abdomen, which ultimately renders them fixed.

Occasionally they give rise to incontinence of urine. The contents of the bladder escape involuntarily. Sometimes they cause complete obstruction of the intestines, either through direct pressure, or through the inflammation set up by them. In this case there is severe pain and vomiting, and unless operative relief is obtained, death is inevitable. When the tumour has attained a large size, the skin of the abdomen presents white lines from the over-stretching, the legs swell, and the veins become enlarged, varicose, and inflamed from the obstruction to the return of the blood to the heart; the liver and midriff are pressed upwards; the cavity of the chest is encroached upon; the bases of the lungs are pressed upon, so that air cannot enter, they become collapsed, and difficulty of breathing and palpitation of the heart ensue.

In this way all the organs in the body become interfered with, their functions become performed imperfectly, nutrition is impaired, sleep is lost, food cannot be taken in sufficient quantity, the patient is unable to lie down, nor can she walk about, she wastes, becomes thinner, hectic fever sets in, and she dies exhausted, or is carried away by some intercurrent disease.

The manner of growth of ovarian cystic tumours is uncertain. In some cases they grow slowly, but still regularly increasing in size; in other cases they grow rapidly, and attain in a brief space of time a large size; while in other cases they remain stationary for months or even years, and then grow again. Ovarian cysts occasionally undergo spontaneous cure. The fluid contents are absorbed, and the cyst wall shrivels up. This, however, is a very rare termination; and when the disease is permitted to take its own course uninterfered with, serious consequences may follow.

The cyst wall may give way, and the contents be poured into the cavity of the abdomen. In some cases no harm follows from this; while in others, in which the fluid has irritating properties, inflammation is set up, and death is almost inevitable. In those cases where the fluid is innocuous, a cure may be effected, or the opening may be closed, and the cyst may fill again.

The pressure of the cyst on the bladder may cause absorption of the wall of the cyst and the wall of the bladder at the point of contact. In this manner the contents of the cyst are poured into the bladder and evacuated, and recovery take place. The discharge may take place also by the intestine.



Inflammation frequently takes place in the peritoneum around the cysts. In this way it contracts adhesions to the neighbouring parts. But the cyst itself may become the seat of inflammation. This inflammation is of a low kind, and always ends in the formation of matter. In fact, the cyst becomes a huge abscess. The signs of this condition are pain in the cyst, heat, fever, and shivering. When the temperature runs high, "emaciation is progressive, appetite lost, throat troublesome, sleep disturbed, nausea or vomiting distressing, and the abdomen tender on pressure, with hurried pulse and respiration; it is extremely probable that one or more cysts contain pus; and when these symptoms are present in an extreme degree, or have lasted a considerable time, the pus has become fœtid."

When the cyst is freely movable in the abdomen, it may be twisted on its stem or pedicle. The result is a strangulation of the vessels conveying blood into the tumour; the blood cannot return along the veins, they become distended, and ultimately burst, giving rise to bleeding, with perhaps great distension and rupture of the cyst, which may end fatally.

Sometimes the contents escape by the fallopian tube into the womb, and out by the vagina. This is a very favourable termination. The opening may remain permanently patent, and thus allow a drain of fluid, as it is secreted by the contracted sac.

Occasionally death occurs suddenly, without any apparent cause. This happens in cases where the tumour has attained a great size, where the abdomen is immensely distended, the lungs pressed upon, and the action of the heart interfered with.

The breasts sometimes suffer sympathetically in these cases. They become swollen, hard, nodulated, and painful. Sometimes they present characters similar to those seen during pregnancy.

*Treatment.*—Until recently the treatment of these tumours was of a very unsatisfactory character, for medicines have no effect, either in arresting their growth or promoting their absorption.

Operative means alone can effect a cure. There are two operations, one of which is usually performed in such cases. One is to tap the cyst, and let out its contents: it is palliative only. Occasionally, however, it effects a cure; but in the great majority of cases the cysts soon fill again.

The other is removal of the cyst. Within recent years this operation has been brought to a great degree of perfection; and though it, like all other operations, is not unattended by danger, yet it gives the only chance of a perfect cure, and the best chance of prolonging life.

## CHAPTER X.

## THE SIGNS OF PREGNANCY.

THERE is no question of greater interest to woman or to the human race than the creation of a new being. This is a process which takes a considerable time to run its course, and the state of the woman in whose body this process of development is going on is called pregnancy. In whatever state or position a woman may be, the signs and symptoms of this condition are such as necessarily to attract her attention. The majority—the very great majority—of women who attain adult life become mothers, and to them the question we are about to discuss is of supreme importance.

It is not very many years since the discovery of pregnancy with absolute certainty has become possible. Before this, another discovery had to be made—that of the stethoscope and auscultation. The discovery of the heart's sounds had again to be made before the stethoscope became applicable to the diagnosis of pregnancy. These were gradual steps, each of which met with much opposition. In the present day, it would not be possible for any one to mislead neighbours and physicians by simulating pregnancy, for the fraud would be at once detected. Sixty years ago, however, Joanna Southcote declared herself pregnant by the Holy Ghost, obtained a number of followers who believed her, and led medical men to state that she was pregnant, and yet it was found after her death that she had never conceived.

During the early months of pregnancy, however, it is not so easy as it may at first sight appear to decide if pregnancy be present or not. It is the custom of the law to refer a prisoner who declares herself *enceinte* to a jury of matrons, and they have to decide; but their decision can never be of any great value, for it requires the greatest skill to answer the question with certainty, even during the later months of pregnancy, while during the earlier months the best skill can at best attain to probability only, but it is at the same time probability amounting almost to certainty.

The time of life at which pregnancy is possible is a matter of importance to bear in mind. It is the time which extends from puberty to the change of life. This is called the fruitful period of life, or period of sexual activity. As a rule, it is the period during which the monthly courses return regularly—that is, between the fourteenth or fifteenth year and the forty-fifth or fiftieth. There are, however, rare instances of pregnancy occurring before the fourteenth year. In India, pregnancy occurs sometimes as early as the tenth or even ninth year. A case is known to have occurred in England, in which a young girl gave birth to a full-grown child soon after she had completed her eleventh year. This is the earliest age at which pregnancy has been known to occur in this country.

As to the latest age at which pregnancy may take place, it may be said that,



though the menses may have ceased to appear, yet it is possible for conception to take place even afterwards. The menses in some cases disappear for a time, and again return after an interval of a few months or years. The menses may continue to return regularly to a great age. Haller states that he delivered one woman in her sixty-third and another in her seventieth year.

The sex of the child is in some places the first question the midwife has to decide on being called to a patient, and the rules according to which this is to be determined are somewhat amusing. Hippocrates said: "A woman with child, if it be a male, has a good colour; but if it be a female, she has a bad colour." And again, "The male foetus is usually seated in the right, and the female in the left." In one of the oldest works in English on midwifery, it is stated—"But if ye be desirous to know whether the conception be man or woman, then let a drop of her milke or twaine be milked on a smooth glasse, or a bright knife, other els on the naile of one of her fingers, and if the milk spread abroad upon it by-and-by, then it is a woman child; but if the drop of milke continue to stand still upon that which is milked on, then it is a signe of a man child.

"Then, if it be a male, then shall the woman with child be well-coloured, and light in going, her belly round, bigger towards the right side than the left (for commonly the man childe lyeth in the right side, the woman in the left side), and in the time of her bearing she shall better digest and like her meate."

Of course the above rules are of no value, because they are not true, as may be proved any day; and it is only the most absurd credulity that ever puts any faith in them. There are, however, some reasons for believing that the ages of the parents exercise some influence on the sex of their offspring, because it appears that when the father is older than the mother more male than female children are born; when younger, more females than males. Attempts have also been recently made to determine the sex of the child by the auscultatory examination of its heart. When the number of the beats of the child's pulse amounts to from 144 to 160 per minute, the child is said to be female; when from 120 to 140, it is said to be male. There is probably some truth in this, and a fair guess may be made by this method of the sex of the child unborn. But this method is far from certain. Indeed, though in a majority of cases it may even prove correct, it will prove to be false in a large minority. It appears that the frequency of the pulse is more directly related to the size and weight of the child than to the sex, so that a big, strong, heavy child has a slower pulse than a small, weakly, and badly-nourished one. Supposing, however, that the children were healthy in any number of given cases, the male would almost in each case weigh more than the female, so that the weight which favours slow pulse would be in the male sex. Thus it is seen that there is some truth in the observation that sex can be discovered by the pulse.

Some curious cases of pregnancy occur where the condition remains quite unsuspected throughout the whole time, and even for the first hours of labour. The late Dr. Tanner reports the following case:—

"I was sent for on Thursday morning, 17th of April, 1862, at nine o'clock, to see Mrs. G——, forty-two years of age, who had been suffering great pain in the abdomen since eleven o'clock on the preceding night. This lady had previously

sought my advice on some half-dozen occasions. She had last consulted me at the beginning of March for an attack of indigestion, on which occasion no mention was made of any enlargement of the abdomen, nor was there any swelling perceptible through her dress. Her history is that she has been married for rather more than three years (since February, 1859), and that she has never been pregnant. The catamenia were lost on some time in June, 1861, but as they had been very scanty for five or six months before, this circumstance did not particularly attract her attention. In fact, she attributed the sensation to the change of life.

"On my arrival at the patient's house, I found her in bed, complaining of great abdominal pain, which had kept her awake the whole night. Her husband and her mother-in-law were present, as well as a married sister who had borne children. I was told that Mrs. G—— had not been well for a fortnight, her breath having been short on making any exertion, and her legs having become swollen. On Wednesday night, at eleven o'clock, she suddenly began to suffer from pain in the stomach, for the relief of which her friends applied a mustard poultice. At two o'clock a.m., the sufferings were so great that a neighbouring medical man was sent for. This gentleman was unable to attend, but sent his assistant, who was said to have stated that the illness was due to 'flatulence and inflammation of the bowels.' He gave a bottle of medicine, the second dose of which, however, caused sickness, and failed to afford any relief.

"On examining the abdomen, I discovered an oval tumour distinctly occupying the right side, and extending from the pelvis to some two inches above the umbilicus. It seemed to be about the size of the adult head; but although the abdominal parietes were thin, the tumour was by no means distinct to the sight, though it was readily made out on palpation. On making a vaginal examination, I found the os uteri dilated to the size of a crown-piece, and the head of a foetus entering the brim of the pelvis with the vertex presenting. The membranes were ruptured; but the patient was not conscious of any discharge of water having taken place, and there was no appearance of moisture on the bed upon which she had been lying all night. On inspecting the breasts, a narrow brown areola was seen; but it certainly did not exceed half an inch in width. When Mrs. G—— was asked if she had felt any movement in her abdomen, she allowed that she had occasionally experienced curious sensations for some weeks past, but these were attributed to flatulence. During the whole period of pregnancy there had been neither sickness nor any feeling of nausea. The moderate increase in size which was perceptible had been attributed to the natural deposition of fat, for all the members of her family are disposed to be stout.

"As the pains were not violent, and the head did not advance, I left the case at nine o'clock, after explaining its nature; but the explanation was received with incredulity, neither the patient nor her husband having the slightest suspicion that pregnancy existed. The sister, however, took steps for obtaining the loan of baby-linen, &c.

"At half-past one in the afternoon, when I returned, the pains of labour were strong and of frequent occurrence. The head was low down, and the parts fully dilated.



"The child (a female) was born with animation suspended; but by a persevering use of artificial respiration, it was resuscitated at the end of half an hour. Although small, it seemed to be a mature infant. She has since become strong and healthy."

Dr. Tanner remarks on the above case:—"The history, however, seems to establish the fact that a woman may conceive, may go to the full time of gestation, and may be in labour for ten hours, without having any suspicion that she is pregnant. It ought perhaps to be mentioned, that from all I have seen and heard of Mrs. G——, no doubt whatever is entertained but that her statements may be taken as strictly true. Independently of this circumstance, it so happens that both parents, though they despaired of ever having a child, were both anxious to have one; and the birth of the little girl was therefore regarded as the happiest event which could befall them.

Other cases have been recorded bearing on the same point, and the fact that pregnancy may occur and its subject be unconscious of it is put beyond dispute.

Cases happen also when women imagine themselves pregnant when they are not. These will be referred to later on.

That women fall into such errors may appear at first sight strange, but a consideration of the signs and symptoms of pregnancy will tend to lessen the wonder that the above statements may have called forth, inasmuch as it will then be seen that there is no sign of pregnancy of which the woman herself can be cognisant which may not be simulated by disease. Though the symptoms which attend, or are associated with, the state under consideration are numerous, they are not all of equal value, and very few of them are absolutely diagnostic of pregnancy; and these few may elude the observation of a skilled physician.

*Suppression of the Menses.*—One of the earliest symptoms of conception having taken place is the suppression of the menses. The menstrual flow does not return at the expected time. This is the general rule, and when a married woman finds that her courses do not appear at the time they are due, she regards herself as being pregnant; and she is usually right in doing so. The rule is, however, not without exception, and therefore too great reliance should not be placed on the fact of menstrual suppression by itself. The menses are not always stopped when conception has taken place. For several months—three, four, or five—the discharge may return regularly, though the woman is pregnant. Cases have occurred, indeed, in which they have returned every month throughout the whole period of pregnancy. Women who had never menstruated have become pregnant, and during their pregnancy have had a menstrual flow every month. Such cases are rare; but the fact of their occurrence is quite enough to invalidate the symptom under consideration as a sign of pregnancy.

Besides, we have already seen that the menses may be suppressed through many other causes than the occurrence of conception. In newly married young women, it is not uncommon for two or three periods to be missed without any known cause. The young wife believes herself pregnant, but she soon finds out her error.

*Nausea and Vomiting.*—Another symptom which appears at an early period of pregnancy is sickness. It usually makes its appearance soon after impregnation,

and last for two or three, or even six months. It may, indeed, continue throughout the whole term of pregnancy. In others, again, it does not come on until the later months. This vomiting is worse in the early part of the day, and has consequently been called "morning sickness." It is hardly necessary to state that its value as a sign of pregnancy is very slight, as it may not only be altogether absent, but similar vomiting may be due to numerous other causes. The vomiting of pregnancy is not due to indigestion, but to a sympathy with the uterus—an irritation of the stomach arising from the condition of the womb. It is considered when not excessive as a good sign, for it is said that "a sick pregnancy is a safe pregnancy."

Together with vomiting, there is often heartburn, waterbrash, pain in the pit of the stomach, and degraded appetite. The woman loathes her usual food, and longs for indigestible and injurious substances. Sometimes there is great increase in the secretion of saliva. Water runs from the mouth almost in a constant stream. Sometimes there is diarrhœa.

*Changes in the Breasts.*—The breasts are organs which sympathise in a very remarkable manner with the womb. When there is disease or irritation of the latter, the former often become painful and swollen. But this sympathy is more marked during pregnancy than in any other condition. At an early period after conception the pregnant woman begins to feel peculiar sensations in the breasts—a feeling of discomfort, soreness, and even pain: soon the organs begin to feel tense, and to throb. About the end of the second month they usually become hard, uneven, and knotty; the blue veins which run under the cutaneous covering become larger and more marked; the dark area around the nipple (the areola) becomes deeper coloured, and large, moist, and uneven on the surface. White lines soon make their appearance on the mammary surface, radiating from the nipples as a centre. Milk or a milky fluid may be made to exude from the nipple on pressure; but this, though popularly regarded as a sure sign of pregnancy, is by no means such. Indeed, no sign can be of much less value when taken, not in conjunction with others, but alone, for milk has been seen in the male breasts, and even in those of new-born babes.

The secretion of milk may also be kept up for years in the breasts of those who have once been pregnant, or it can be excited after even years of suspension. Dr. Livingstone, in his "Missionary Travels and Researches in South Africa," relates the following curious examples:—

"Masina of Kuruwan had no children after the birth of her daughter Sina, and had no milk after Sina was weaned, an event which is usually deferred until the child is two or three years old. Sina married when she was seventeen or eighteen, and had twins; Masina, after at least fifteen years' interval since she last suckled a child, took possession of one of them, applied it to her breast, and milk flowed, so that she was enabled to nurse the child entirely. Masina was at this time at least forty years of age. I have witnessed several other cases analogous to this. A grandmother of forty—or even less, for they become withered at an early age—when left at home with a young child, applies it to her own shrivelled breast, and milk soon flows. In some cases, as that of Mabogosing, the chief wife of Mahure,



who was about thirty-five years of age, the child was not entirely dependent on the grandmother's breast, as the mother suckled it too. I had witnessed the production of milk so frequently by the simple application of the lips of the child, that I was not therefore surprised when told by the Portuguese in Eastern Africa of a native doctor, who, by applying a poultice of the pounded larvæ of hornets to the breasts of a woman, aided by the attempts of the child, could bring back the milk. Is it not possible that the story in the 'Cloud of Witnesses,' of a man during the time of persecution in Scotland putting his child to his own breast, and finding, to the astonishment of the whole country, that milk followed the act, may have been literally true? It was regarded and quoted as a miracle; but the feelings of the father towards the child of the murdered mother must have been as nearly as possible analogous to the maternal feeling; and as anatomists declare the structure of both the male and female breasts to be identical, there is nothing physically impossible in the alleged result. The illustrious Baron Humboldt quotes an instance of the male breast yielding milk; and though I am not conscious of being over-credulous, the strange instances I have examined in the opposite sex make me believe that there is no error in that philosopher's statement."

Of all the changes which take place in the breast during pregnancy, those in the areola are the most important and most trustworthy. They begin about the second month in a deepening of the hue, a tumescence, a moistening of the surface, and an enlargement of the small glands on them.

Dr. Montgomery has described these changes as follows:—"During the progress of the next two or three months the changes in the areola are in general perfected, or nearly so, and then it presents the following character:—a circle around the nipple, whose colour varies in intensity according to the particular complexion of the individual, being usually much darker in persons with black hair, dark eyes, and sallow skin than in those of fair hair, light-coloured eyes, and delicate complexions. The area of this circle varies in diameter from an inch to an inch and a half, and increases in most persons as pregnancy advances, as also does the depth of colour. I have seen the areola at the time of labour almost black, and upwards of three inches in diameter, in a young woman of very dark hair and complexion, while in another instance its breadth around the base of the nipple did not at any time of gestation amount to a quarter of an inch, and at first was not more than an eighth. This circle, however, narrow as it was, was studded at nearly regular intervals with the glandular tubercles, which were not unlike a ring of beads." Around the deep-coloured circle immediately surrounding the nipple appears another ring of a much fainter tint, called the secondary areola. This has a mottled appearance, which has been aptly compared to the effects of drops of rain falling on a tinted surface, and discharging the colour. This symptom is more valuable in a first than in a subsequent pregnancy, for after the first the areola remains permanently larger and darker.

The dark colour is due to a deposition of pigment in the skin. Similar pigmentary deposits are met with elsewhere. There is often a dark line running from the pubes up to the navel, and from thence on again to the lower end of the

breast-bone. Around the navel it forms a dark circle: a dark circle is sometimes also formed around the eyes. Discoloured patches are occasionally seen on other parts of the body—as the forehead, face, or neck—which may disappear after labour, but may remain permanently.

Soon after conception the womb begins to grow rapidly: it becomes heavier, and sinks lower in the pelvis. This gives rise to a flattening of the abdomen below the umbilicus—between that point and the pubes—and has given rise to the French proverb—“*En ventre plat, enfant il y a.*” At this time there is frequently some urinary trouble—a frequent desire to pass water. From the third to the fourth month the womb, which had sunk somewhat in the pelvis, has attained a size too large for that cavity to contain it, and consequently it rises into the cavity of the abdomen. Now the abdomen instead of being flattened is swollen: the woman feels herself larger, her clothes are tight, and she has a sense of fulness. At the same time the womb may be distinctly felt as a round, globular, smooth mass rising from the pelvis.

The womb itself has also undergone marked changes—changes in shape and consistence. The neck has become enlarged, very much softer, and its opening bigger. The glands on its surface are more marked, and can be easily felt. The circulation through the organ has much increased, and the lining membrane of the neck and the vagina has become darker, and of a livid or violet colour.

A symptom which is popularly regarded as an absolutely certain sign of pregnancy is the sensation felt by the woman and called “quickening.” The term was applied to convey the erroneous idea that the child then became alive or quick, and that it was not so before that event. This is known to be incorrect, inasmuch as the child or embryo is alive from the first, though its life is a lower form of life than it is after the fifth or sixth month, just as the life of a child an hour before birth is a lower form of life than that it possesses an hour after birth. Marvellous statements have been made, and discussions carried on, as to the time when the child first possesses a soul, but we cannot say that this mystery has been made any clearer by any statements that have been made regarding it. Let it suffice here to say that from the time of conception there is life in the embryo, simple though it be when compared with the higher life of a born child or an adult man, yet too complex to be solved by the greatest philosopher.

There can be no doubt that quickening is of some value in the diagnosis of pregnancy. At the same time its value has been greatly over-rated. It is thought by women generally not only to mark the time when the embryo first starts into life, but also to occur always at the middle of pregnancy—at about four and a half months. Usually it happens about the end of the fourth month, or, to give a wider range and be more accurate, between the fourteenth and eighteenth weeks. It sometimes takes place earlier—as early as the tenth week—but this is very rare. In many cases it does not happen until much later, and in some not at all.

The sensation felt at the time is described differently by different women. They say it is a peculiar flutter, a tapping, or a pulsation or a thrill in the region of the womb, sometimes a tremulous motion like that of a little bird held in the



hand. Dr. Montgomery describes the phenomena as follows:—"Under ordinary circumstances when quickening does occur, but especially if it happens with the sudden ascent of the uterus from the pelvis, the woman is apt to feel an unusual degree of nervous agitation, which not unfrequently ends in faintness, or even complete syncope, after which she is sensible of a slight fluttering sensation, which from day to day becomes more distinct, until she fully recognises the motions of the child."

The causes of these phenomena are a matter of question, and subject to considerable difference of opinion. Some believe that they are due to the movements of the child, and that the mother at that time becomes conscious of them for the first time—this is the more generally received opinion; others believe they are due to the sudden ascent of the womb from the pelvis to the abdominal cavity; while a third party refers them to the first contractions of the uterine wall. It is probable that the three views are correct, for the sensations described by different women must be ascribed to different causes. In one case they are due to the movements of the child, in another to uterine contractions, and in a third to sudden ascent of the uterus; but more than one may co-operate in producing the sensation.

From this time onward the mother becomes more conscious of peculiar sensations, and there is no room to doubt that these sensations are due to the movements of the child—that is, when pregnancy is present. We say when pregnancy is present, because we shall see by-and-by that such sensations ascribed to the movements of the child are sometimes felt by women who are not pregnant, even by women who have had children, and therefore know the character of the sensations due to the child's motions in the uterus. Some women feel these sensations only in a very slight degree; others, again, feel the greatest annoyance, discomfort, and even pain from them—they cannot sleep, and therefore seek advice with a view to control them; others, again, never feel the child at all from the beginning to the end of pregnancy.

Again, it not unfrequently happens that women believe themselves pregnant, and have many or all the subjective sensations associated with that state, while in reality they are not in the family way. These are very peculiar cases. They may occur at any age from twenty-five to fifty, but usually about the change of life—during the "dodging-time." Often this happens to women who wish to believe they are in an interesting state, and are desirous of having a family. But it happens also to women who have had several children, who ought to know what the sensations and feelings associated with pregnancy are, and who have not the least desire to have an addition to their already large families. Several such cases have come under our observation, and in some cases we have found it impossible to persuade them of their error. Time alone—that great solver of intricate questions and knotty points—will convince them of their mistake; and even against its unanswerable arguments they persevere in their belief (for after the usual period of pregnancy has elapsed, up to the tenth, twelfth, fourteenth month, or even longer, they prove faithful to their creed), until finally they renounce it for very shame.

The causes of these abnormal sensations are various: it may be a false conception, a tumour of the uterus or ovary, some disease of the organs of generation, twitching of the muscles of the abdomen, retention of the menstrual discharge in the womb, movements of gas in the intestines, or an unnatural pulsation of the large vessels of the abdomen. We have said enough to show that quickening—though a valuable sign of pregnancy—cannot be depended upon as a sure sign of that state.

After the time of quickening—or, more accurately, after the womb has ascended from the pelvic into the abdominal cavity—the organ rapidly grows in size, and the abdomen enlarges. At the fifth month the upper border of the uterus reaches to a point midway between the pubes and navel. The navel, which had hitherto been considerably depressed, becomes now less so. In the sixth month the womb reaches to a level with the navel, and the navel itself is almost on a level with the surrounding surface—the depression is almost effaced.

In the seventh month the womb is still larger, and inclined to the right side, and reaches to a point midway between the navel and the lower end of the breast-bone. The depression of the navel is quite effaced.

In the eighth month the organ reaches the lower end of the breast-bone, and becomes wider. The navel itself is not only not depressed, but is now pushed forward and prominent beyond the neighbouring surface.

In the ninth month the womb sinks somewhat lower, and the navel becomes still more prominent.

During these—the last four months of pregnancy—the symptoms become more marked, and certain indisputable signs of the condition make themselves manifest. These refer chiefly to the child, and most of them require special knowledge and skill for their detection and recognition—especially knowledge and skill in auscultation, though others may be obtained by careful manipulation or palpation.

If the hand be laid flat on the abdomen, and retained there for a little time, certain peculiar movements will be felt. These may be due to three causes. In the first place they may arise from the contraction of the uterus itself. In this case the tumour formed by the gravid womb becomes harder, firmer, more tense and resisting, and after a while relaxes again. These contractions take place at intervals from the fourth or fifth month; indeed, from the time the uterus can be felt in the abdomen until the end of pregnancy.

But if the hand be still retained in the same position on the abdomen, other movements will soon make themselves felt. These are little blows or kicks given suddenly—perhaps two or three in succession—and then all is quiet again. They may, however, be continued for some time, especially during the later months: indeed, as has been already stated, they may be so frequent and strong as to be a source of great annoyance, and even of sleeplessness.

Other sensations may be felt by this method which are unconnected with the womb, and these may be mistaken for those produced by the movements of the child or the contractions of the uterine wall. They are due to the sudden contractions of the muscles of the wall of the abdomen, or to the movements of gas in the intestine. In some cases it is difficult to distinguish between the



sensations felt from this cause and those arising from pregnancy, for both may have very much the same characters; so that feeling movements in the abdomen, unless they can be distinctly recognised as due to the motions of the child, is not a sure sign of pregnancy.

Another sign is *repercussion* or *ballottement*. This may be practised by simple abdominal palpation, or through the vagina. The latter method is more generally adopted by physicians, inasmuch as it is more certain in its results. The sign depends upon the fact that the child is a solid body floating in a fluid, and that certain movements can be given to that body so as to make its presence felt. If the woman lie on her side, and a hand be laid flat on the abdomen under the projecting womb, so that a hard resistance be felt, and then a smart sharp jerk upwards be given, this feeling of hard resistance will disappear, and immediately afterwards a perceptible tap will be felt, and the feeling of resistance returns. These phenomena are explained in the following manner:—By the sudden jerk the child, which has gravitated to the lowest possible position, is pushed upwards, floating in its surrounding fluid; immediately, however, it begins to descend again by gravitation, and strikes the wall of the uterus at the spot where the hand is applied.

This is not a certain sign of pregnancy, though in the infinite majority of cases it may be relied upon; yet the sign may be obtained in other conditions than pregnancy. For instance, in some rare forms of ovarian tumours a solid body is found floating in the fluid of a cyst—a condition which would give rise to *repercussion* or *ballottement* under proper manipulation. The known rarity of such cases, however, render the *ballottement* a valuable sign of pregnancy.

But by palpation or manipulation through the abdominal wall much more may frequently be learnt than simply the existence of pregnancy. If the walls of the abdomen be not too rigid or too thick from the deposition of fat, the shape of the child can be without much difficulty made out; its limbs, its buttocks, its back, and its head can be distinguished, and in this way the exact position which it occupies may be recognised. Moreover, by taking advantage of this knowledge, one of the greatest recent advances in midwifery and the treatment of labour has been attained.

Knowing the position occupied by the child or *fœtus* in the womb, knowing that it floats therein surrounded by a fluid, and knowing that by slight force it can be easily moved in that fluid, it became evident that by careful and well-directed manipulation the position of the child could be altered at will, and practice has abundantly proved the accuracy of the inference. When it is known that the child occupies an unnatural position, or a position which is unfavourable to birth, or which renders labour prolonged and consequently dangerous to the mother and child, advantage may and should at once be taken of the power of changing the position of the child in the manner described into a more natural or favourable one. In this way great and serious danger may often be avoided. This method of “turning,” as it is called, is one of the greatest triumphs of modern obstetric art.

But by far the most reliable of all the signs of pregnancy is the beating of the child's heart. This is an absolutely certain symptom of that state, and with ordinary care no other can be mistaken for it. Indeed, nothing can simulate it so as

to deceive a careful observer. It requires for its recognition, however, a skilled observer, an educated ear. It is known that by listening over the heart of a grown-up person certain sounds are heard. These sounds are double, and repeated about seventy or eighty times a minute, and are produced by the action of the heart. In a similar manner the heart of the child produces double sounds, which become audible by means of the stethoscope about the fifth month, and continue to increase in loudness from that time up to the end of pregnancy. They are heard generally over a limited spot of the abdomen. The position of this spot varies in different cases, and in the same case, according to the position of the child. The sounds are much more frequent than the sounds of the mother's heart or the beats of her pulse, being from 120 to 160 a minute. The sounds are double, and have received the name of "tic-tacs," from their resemblance to the sounds of a watch. Several things may be learnt, with a certain degree of probability, by observing the character and position of the sounds of the child's heart. As the place in which the sounds are heard is a very limited area, and varies in position with the position of the child, the latter can to a certain extent be inferred from the former. Moreover, recent investigations go to show that the number of the sounds per minute varies more or less with the sex of the child. If the pulse be very quick, the child is a female; if slow, the child is a male. The question has already been discussed.

Besides, it is possible by auscultation to detect in some cases twin pregnancy. If two distinct foetal pulsations can be heard, audible at distant spots of the abdomen, there can be but one inference—that is, that there are two hearts producing the two pulsations; and if two hearts, then two children.

When the foetus is dead, the heart does not beat, and the heart sounds are not produced, and consequently cannot be heard, so that pregnancy may exist without foetal heart sounds. In some cases also of ordinary healthy pregnancy it is not possible after the most careful examination to detect the heart sounds; so that, though the presence of the sounds of the child's heart is an indisputable sign of pregnancy, yet the absence of such sign does not negative the condition.

Another sign of pregnancy is the funic souffle. It is the sound produced when the funis or chord is pressed upon. It is, however, very rarely audible. When heard, it is a sure sign of the presence of pregnancy.

The uterine or placental "souffle or bruit" is yet another sign of the state under consideration. It becomes audible about the fourth month of pregnancy. It comes and goes. It is heard for a short time, and then disappears, and again returns in a short time. Various theories have been advanced with regard to the mode of its production. It is not characteristic of pregnancy. It, or a sound similar to it, is often heard in other conditions, as when fibrous tumour is present.

Besides these, many other sounds may be heard over the abdomen: sounds due to the movements of the child—these are dull thuds, accompanied by a sudden jerk or impulse; sounds due to the movements of gas and fluids in the intestines, &c.

It is evident, then, that there are only two absolutely sure signs of pregnancy, and these can be recognised with certainty by a skilled observer only—an observer skilled in auscultation and manipulation. These signs are the sounds of the heart of the child or foetus, and the sensations produced by the different parts of the



child, so as to distinguish those parts. It is not enough to recognise the presence of a solid body floating in a fluid, though this would supply evidence of the probability approaching to certainty of the presence of pregnancy; but the condition is met with, though infinitely rarely, in tumours. On the other hand, the sounds of the foetal heart cannot be simulated, and though pregnancy may exist and the sounds be not present (as when the child is dead) or inaudible; yet, when heard, there can be no question about the diagnosis.

The condition of the nipple and its surrounding coloured ring has been said to be absolutely characteristic: in most cases, doubtless, it is characteristic, but disease may give rise to a condition of breasts undistinguishable from that of pregnancy.

During the later months of pregnancy, then, certain sure signs of that condition may be discovered by auscultation and palpation, or manipulation of the abdomen, but during the earlier months no such signs are discoverable; yet, by a careful examination of the breasts, abdomen, and womb through the vagina, a conclusion may be arrived at possessing an amount of probability approaching to certainty.

Besides the symptoms enumerated, many curious changes in the dispositions, habits, and constitutions of women occur now and then during pregnancy, and though these cannot be accounted as symptoms of that condition in the generality of women, yet in those in whom they have occurred once they may be so considered. Changes of disposition, for instance, sometimes happen during this period. A good-tempered woman and well-disposed may become irritable and malicious; fortunately, on the other hand, every now and then a stepmother, who is the terror of the smaller members of the family, becomes the light of the household, kindness itself. Some women lose their memory, others sight, others their voice, to regain them again after labour. Nervous disorders of pregnancy take every shape and form. Sometimes, instead of the loss of a sense, it is the gain of one that occurs. Women who are melancholy and pensive, and even imbecile, have regained the perfect use of their mental faculties during pregnancy, to lose them again after parturition. Women who are deaf have regained the sense of hearing. Such occurrences are at present inexplicable, but they are doubtless due to an increase of nervous sensibility.

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## CHAPTER XI.

### THE DURATION OF PREGNANCY.

THIS is a subject in which every member of society, and especially every woman, is interested. Considering the frequency of the occurrence of the condition, and, as might be thought at first sight, the material at hand for the question, it would seem strange that it is even now a disputed question. There is, however, no doubt, and all are agreed upon this point, that the average duration of pregnancy is about nine calendar or ten lunar months—from 273 to 280 days. But at the same time, there

is equally little doubt that the duration of this state may vary, but to what degree this variation may amount has been the subject of hot debate. The law of England does not fix the limit of variation, and wisely. Blackstone says:—"From what has been said, it appears that all children born before matrimony are bastards by our law; and so it is of all children born so long after the death of the husband, that by the usual course of gestation they could not be begotten by him. But this being a matter of some uncertainty, the law is not exact to a few days."

By the Code Napoléon, the duration of pregnancy is fixed at 300 days; by the Scotch law, ten solar months is fixed as the longest duration of the condition; by the Prussian law, 302 days; by the Roman law, ten lunar months.

Some cases of undoubted prolonged gestation have occurred, but they are by no means numerous; indeed, many of the cases recorded as such cannot be accepted, for the evidence in their favour is too imperfect. At the same time, there are undisputed instances of cases in which pregnancy lasted 290, 300, and even 317 days—that is, a period of ten, twenty, and even thirty-seven days beyond the usual forty weeks.

Some authors state that pregnancy may last a year, or even two or three. The Chinese say that pregnancy usually lasts seven or eight months, and sometimes one, two, or even four years.

In Egypt, it has been decided by the interpreters of the law that "children may remain in their mother's womb for four years. After five years, this cannot be."

On the other hand, the duration of pregnancy may be less than the traditional nine months, and the child be fully and perfectly developed. Children born at the eighth month may be of full size, full weight, and full development. Women differ by several days in the duration of pregnancy, probably because of some peculiarity inherent in themselves. In other words, every woman has a period of gestation proper and peculiar to herself. In some cases, this period is less by three or four weeks, in others more by four or five weeks, than the generally-accepted forty weeks. Still, the great majority of women are confined in the fortieth week of pregnancy.

The time of expected confinement is often estimated from the time of quickening. This, though in some cases of a certain value, is liable to mislead greatly. When made the basis of calculation of the time of expected confinement, it is generally regarded as the middle of pregnancy. We have already pointed out, however, that quickening may occur at any time after the tenth week; and though it may happen at the end of the fourth month, yet it usually happens between the fourteenth and eighteenth weeks; and we have also said that it may not happen at all. It should, however, be called in as an auxiliary to decide the time of confinement, rather than be made the basis for the calculation. The usual method adopted by physicians is to calculate from the last day of the last menstrual flow. From that time they count 273 days, and in the week after the confinement may be expected—that is, between 273 and 280 days after the cessation of the last catamenia. Thus, suppose the catamenia ceased on the 10th of March, labour would be expected between December 8th and December 15th.



There is sometimes a difficulty in estimating the date of labour by this method, because, as we have mentioned, the menses may not have been suppressed after conception, but may have returned for two, three, or four periods afterwards. In such cases, quickening becomes of value, in order to correct any error that the appearance of the menses may have given rise to. In such cases, however, the time of expected confinement must necessarily be very uncertain, and cannot be calculated with any accuracy. Other cases, again, occur in which it becomes difficult, or even impossible, to determine the date of labour. For instance, a woman has ceased to menstruate in March—in July she becomes pregnant. In such a case, it is evident that the duration of pregnancy cannot be dated from the last appearance of the menses. Were it done, it would lead to an error of three or four months. Quickening would become valuable as an auxiliary in this case again; but by far the best method of estimating the duration of pregnancy in such cases, is to examine the abdomen carefully, and see how high the uterus reaches. In this manner, moderately accurate conclusions may be arrived at.

The annexed table will show at a glance when labour may be expected to take place in a person who has always been regular. The dates in the first column are those of the last appearance of the menses; those in the second, 273 days, those in the third, 280 days from that date.

TABLE SHOWING THE DURATION OF PREGNANCY.

Last Day of Last Menstrua- tion.	Time of Expected Confinement.		Last Day of Last Menstrua- tion.	Time of Expected Confinement.		Last Day of Last Menstrua- tion.	Time of Expected Confinement.	
	Earliest, 273 Days.	Latest, 280 Days.		Earliest, 273 Days.	Latest, 280 Days.		Earliest, 273 Days.	Latest, 280 Days.
January	October	October	February	November	November	March	December	December
1	1	8	4	4	11	9	7	14
2	2	9	5	5	12	10	8	15
3	3	10	6	6	13	11	9	16
4	4	11	7	7	14	12	10	17
5	5	12	8	8	15	13	11	18
6	6	13	9	9	16	14	12	19
7	7	14	10	10	17	15	13	20
8	8	15	11	11	18	16	14	21
9	9	16	12	12	19	17	15	22
10	10	17	13	13	20	18	16	23
11	11	18	14	14	21	19	17	24
12	12	19	15	15	22	20	18	25
13	13	20	16	16	23	21	19	26
14	14	21	17	17	24	22	20	27
15	15	22	18	18	25	23	21	28
16	16	23	19	19	26	24	22	29
17	17	24	20	20	27	25	23	30
18	18	25	21	21	28	26	24	31
19	19	26	22	22	29			January
20	20	27	23	23	30	27	25	1
21	21	28			December	28	26	2
22	22	29	24	24	1	29	27	3
23	23	30	25	25	2	30	28	4
24	24	31	26	26	3	31	29	5
		November	27	27	4	April		
25	25	1	28	28	5	1	30	6
26	26	2	March			2	31	7
27	27	3	1	29	6		January	
28	28	4	2	30	7	3	1	8
29	29	5		December		4	2	9
30	30	6	3	1	8	5	3	10
31	31	7	4	2	9	6	4	11
February	November		5	3	10	7	5	12
1	1	8	6	4	11	8	6	13
2	2	9	7	5	12	9	7	14
3	3	10	8	6	13	10	8	15

TABLE SHOWING THE DURATION OF PREGNANCY (continued).

Last Day of Last Menstrua- tion.	Time of Expected Confinement.		Last Day of Last Menstrua- tion.	Time of Expected Confinement.		Last Day of Last Menstrua- tion.	Time of Expected Confinement.	
	Earliest, 273 Days.	Latest, 280 Days.		Earliest, 273 Days.	Latest, 280 Days.		Earliest, 273 Days.	Latest, 280 Days.
April	January	January	June	March	March	August	May	June
11	9	16	18	18	25	25	25	1
12	10	17	19	19	26	26	26	2
13	11	18	20	20	27	27	27	3
14	12	19	21	21	28	28	28	4
15	13	20	22	22	29	29	29	5
16	14	21	23	23	30	30	30	6
17	15	22	24	24	31	31	31	7
18	16	23			April	September	June	
19	17	24	25	25	1	1	1	8
20	18	25	26	26	2	2	2	9
21	19	26	27	27	3	3	3	10
22	20	27	28	28	4	4	4	11
23	21	28	29	29	5	5	5	12
24	22	29	30	30	6	6	6	13
25	23	30	July			7	7	14
26	24	31	1	31	7	8	8	15
		February		April		9	9	16
27	25	1	2	1	8	10	10	17
28	26	2	3	2	9	11	11	18
29	27	3	4	3	10	12	12	19
30	28	4	5	4	11	13	13	20
May			6	5	12	14	14	21
1	29	5	7	6	13	15	15	22
2	30	6	8	7	14	16	16	23
3	31	7	9	8	15	17	17	24
	February		10	9	16	18	18	25
4	1	8	11	10	17	19	19	26
5	2	9	12	11	18	20	20	27
6	3	10	13	12	19	21	21	28
7	4	11	14	13	20	22	22	29
8	5	12	15	14	21	23	23	30
9	6	13	16	15	22			July
10	7	14	17	16	23			1
11	8	15	18	17	24	24	24	2
12	9	16	19	18	25	25	25	3
13	10	17	20	19	26	26	26	4
14	11	18	21	20	27	27	27	5
15	12	19	22	21	28	28	28	6
16	13	20	23	22	29	29	29	7
17	14	21	24	23	30	30	30	
18	15	22			May	October	July	
19	16	23	25	24	1	1	1	8
20	17	24	26	25	2	2	2	9
21	18	25	27	26	3	3	3	10
22	19	26	28	27	4	4	4	11
23	20	27	29	28	5	5	5	12
24	21	28	30	29	6	6	6	13
		March	31	30	7	7	7	14
25	22	1	August	May		8	8	15
26	23	2	1	1	8	9	9	16
27	24	3	2	2	9	10	10	17
28	25	4	3	3	10	11	11	18
29	26	5	4	4	11	12	12	19
30	27	6	5	5	12	13	13	20
31	28	7	6	6	13	14	14	21
June	March		7	7	14	15	15	22
1	1	8	8	8	15	16	16	23
2	2	9	9	9	16	17	17	24
3	3	10	10	10	17	18	18	25
4	4	11	11	11	18	19	19	26
5	5	12	12	12	19	20	20	27
6	6	13	13	13	20	21	21	28
7	7	14	14	14	21	22	22	29
8	8	15	15	15	22	23	23	30
9	9	16	16	16	23	24	24	31
10	10	17	17	17	24	25	25	August
11	11	18	18	18	25	26	26	1
12	12	19	19	19	26	27	27	2
13	13	20	20	20	27	28	28	3
14	14	21	21	21	28	29	29	4
15	15	22	22	22	29	30	30	5
16	16	23	23	23	30	31	31	6
17	17	24	24	24	31			7



TABLE SHOWING THE DURATION OF PREGNANCY (*continued*).

Last Day of Last Menstrua- tion.	Time of Expected Confinement.		Last Day of Last Menstrua- tion.	Time of Expected Confinement.		Last Day of Last Menstrua- tion.	Time of Expected Confinement.	
	Earliest, 273 Days.	Latest, 280 Days.		Earliest, 273 Days.	Latest, 280 Days.		Earliest, 273 Days.	Latest, 280 Days.
November	August	August	November	August	August	December	September	September
1	1	8	23	23	30	12	11	18
2	2	9	24	24	31	13	12	19
3	3	10			September	14	13	20
4	4	11	25	25	1	15	14	21
5	5	12	26	26	2	16	15	22
6	6	13	27	27	3	17	16	23
7	7	14	28	28	4	18	17	24
8	8	15	29	29	5	19	18	25
9	9	16	30	30	6	20	19	26
10	10	17	December			21	20	27
11	11	18	1	31	7	22	21	28
12	12	19		September		23	22	29
13	13	20	2	1	8	24	23	30
14	14	21	3	2	9			October
15	15	22	4	3	10	25	24	1
16	16	23	5	4	11	26	25	2
17	17	24	6	5	12	27	26	3
18	18	25	7	6	13	28	27	4
19	19	26	8	7	14	29	28	5
20	20	27	9	8	15	30	29	6
21	21	28	10	9	16	31	30	7
22	22	29	11	10	17			

## CHAPTER XII.

## THE DISORDERS OF PREGNANCY.

Vomiting—Increased Secretion of Saliva—Enlargement of the Veins of the Legs—Piles—  
Urinary Troubles—Flooding.

WHEN enumerating the signs of pregnancy we spoke of the sympathy between other organs and the uterus; and although this is almost at all times manifested, yet it is peculiarly marked when conception has taken place. To this peculiar relation is due many of the disorders of pregnancy, though others arise from the pressure exercised by the enlarged uterus.

One of the first symptoms following conception is *vomiting and nausea*. This is present at some time in almost all pregnancies. It is due to the sympathy between the stomach and the uterus. Being present in nearly every case of gestation, morning sickness may be regarded as a natural condition; yet, in some cases, the sickness and nausea are so excessive as to endanger the life of the patient, and in such cases they cannot be regarded as normal, but as morbid. It is generally believed that women suffer more from sickness during their first than during their other pregnancies. It is also said to be worse when the fœtus is a male than when it is a female. Normally the sickness is limited to the morning; it is most common on getting out of bed in the morning. The vomited matter is watery, acid, sometimes bile, and mucus. The appetite is not lost, and the patient makes a hearty breakfast.

In cases where the sickness assumes the character of disease, the stomach refuses everything. No food of any kind is retained. This may go on for weeks, and then cease suddenly; or it may go on for months, and exhaust the patient's strength. The patient becomes thinner and thinner; she faints with the least exertion. The face becomes worn and anxious, and the eyes sunken. Vomiting continues even when the stomach is empty; there may be severe pain in the pit of the stomach; and unless the vomiting be controlled the patient dies. Many such cases have occurred.

The *treatment* of such cases is sometimes difficult. The vomiting may be so intractable as to defy the influence of all medicines. In most cases it can be controlled, and generally by simple means. A cup of tea in bed, or breakfast before getting up, effectually stops it in some cases. Some will retain cold and reject hot food. Ice is of great service in all kinds of vomiting. Place bits of it in the mouth and let them melt.

The bowels should be carefully attended to. They should be made to act regularly, and never be allowed to become constipated. If the liver be sluggish, a dose of blue pill now and then will prove of use, and afterwards a black draught, or a dose of castor oil. Most useful are Friedrichshall and Pullna water and Carlsbad salts, taken two or three times a week, or even every morning if necessary. Few things are of equal service with these mild purgatives. Effervescing draughts are sometimes useful. Bitters and soda, hydrocyanic acid, creosote, and salts of cerium are useful in their turn.

External applications are occasionally useful, as a small blister, mustard poultices, and turpentine stupes to the pit of the stomach. A liniment of belladonna or camphor applied to the same part in some cases proves effectual.

The patient should keep quiet, in fact rest in the recumbent position. She should be careful what she eats—never to take anything that she knows disagrees with her, and to take the most nourishing food the stomach will retain in small quantities. If there be great exhaustion stimulants are useful; they act best in an effervescing form, as champagne, or brandy and soda or seltzer. At the same time it is better to avoid them unless they are absolutely necessary.

Should the vomiting resist all treatment, and the stomach reject everything, it becomes necessary to keep up the strength of the exhausted and feeble patient by means of injections of food into the bowel—by nutritive clysters. These should consist of beef tea. About two ounces should be administered each time. If necessary, a little brandy should be added each time. It may be repeated every four hours.

Cod-liver oil or olive oil may also be rubbed into the skin, with a view to keep up the strength by cutaneous absorption. But the vomiting may go on to such a degree as to excite the uterus to contract and expel its contents. Abortion or premature labour then occurs.

This gives a clue to a method of treatment in severe and intractable cases. Nature is a great teacher, a great saver as well as a great destroyer. In this case nature destroys the child and saves the mother; the child's life is sacrificed and the mother's spared; and seeing this we learn to imitate it. The cases in which such



extreme measures are called for are of extreme rarity. It happens only when the mother's life is in imminent and urgent peril; then it becomes a duty to act promptly and empty the uterus, and thus save the only life that can be saved, unless, indeed, it be in the later months of pregnancy, when both lives—the mother's and the child's—can in this manner be spared. Repulsive as it is to destroy the child, still it is the highest duty, and no hesitation should be felt in sacrificing it in the circumstances stated, for unless this be done, and done promptly, not only the life of the child, but that of the mother will also be lost. We say this because women have died from the effects of vomiting during pregnancy, and numerous cases have occurred in which the vomiting has ceased as soon as the womb has been emptied. At the same time the greatest precautions should be observed before this last step is taken, for some women have recovered from the greatest danger when it was thought it had been impossible for them to survive. That such cases have perfectly recovered should not be lost sight of, and abortion should not be induced until the peril is imminent.

Some women are better when pregnant than at any other time. They eat better, grow fatter and stronger. Others, again, lose their appetite, though there is no excessive vomiting; others have depraved tastes, desiring indigestible and injurious food. Some suffer pain in the pit of the stomach, especially when food is taken; others have water-brash and acidity or heartburn. All these symptoms point to the intimate sympathy between the stomach and uterus, and warn the future mother to be careful of her diet. She should avoid foods that are likely to turn acid, as those which contain much sugar, and those which are likely to generate gas, as well as all indigestible and innutritious substances. Effervescing draughts of soda and lime-juice or citric acid relieve the heartburn temporarily; in other cases acidulated bitter draughts, as the dilute hydrochloric acid and calumba, with an occasional dose of blue pill, cure it permanently.

*Salivation, or an Increase in the Secretion of Saliva.*—There is, probably, in all cases of pregnancy an increase of salivary secretion, but this does not become apparent. In some cases, however, it becomes a very troublesome symptom. The saliva is constantly running out at the corners of the mouth, and may amount in twenty-four hours to two or three pints. It occurs usually at an early period, and lasts for three or four months, but sometimes during the whole period of pregnancy. The mouth looks healthy, but the salivary glands are somewhat enlarged.

The *treatment* should be general as well as local. The bowels, which are usually constipated, should be acted upon freely. A wash for the mouth, containing borax or chlorate of potash, sometimes proves useful. Small blisters behind the ears, or at the back of the neck, sometimes relieve. In the majority of cases the trouble ceases of itself; in some instances, however, it resists all treatment, lasting until pregnancy is over.

Constipation is a condition frequently accompanying pregnancy, and when allowed to go on for a long time it may prove troublesome and serious in its results. Should the constipation come on suddenly, and be followed within a short time by violent sickness, rupture should be looked for. Such a condition is of a most grave character, and requires very careful treatment. Purgatives should be avoided, and

the bowels quieted. The rupture should be reduced ; and, should this be impossible, an operation should be performed for its relief. Unless the bowel be returned by means of manipulation or operation, death is certain.

In simple constipation the diet should be carefully regulated, with a view to regulate the bowels ; fruit, vegetables, &c., should be taken. As an aperient when required, Friedrichshall or Pullna water, manna, citrate of magnesia, or castor oil are the most useful. Clysters of soap and water are frequently recommended, and are of great use in some cases ; but for regulating the bowels, we know of nothing better than the mineral waters above named.

Occasionally diarrhœa occurs during pregnancy. When slight, it should not be interfered with, but treated simply by diet. The patient should avoid fruit and vegetable diet, and take milk, eggs, rice, &c. Should it become troublesome, a little bismuth generally stops it.

*Enlarged Veins (Varicose Veins).*—Enlargement of the veins of the legs is a very frequent occurrence towards the end of pregnancy. It appears in a first, and becomes worse with every succeeding pregnancy. It is accompanied by much pain of an aching character. The veins become sometimes very large, and appear like huge cords—almost like ropes standing out above the surrounding surface—hard and tender. The skin and tissues around them become red and inflamed. The redness is of an angry dusky hue. The whole neighbouring tissue becomes hard and resistant. The inflammation may go on to ulceration, or a vein may burst, and profuse hæmorrhage follow.

The *treatment* consists in regulating the bowels, and the application of a bandage over the whole limb, or of an elastic stocking. Rest in the recumbent posture is imperative. Should a vein burst, the bleeding should be stopped by pressure on the lower side of the opening, as the blood in the veins flows upwards towards the heart.

*Piles (hæmorrhoids)* are exceedingly common during pregnancy. They are due to constipation, or to the pressure of the womb on the vessels above. They consist of little swellings around the opening of the bowels, projecting out of it. They cause but little pain at first, though they are irritable ; but when they are inflamed or constricted after a straining at stool, they give rise to the most exquisite agony. They sometimes bleed profusely, after which considerable relief is obtained.

The *treatment* of piles is that of the bowels. Gentle laxatives to prevent constipation—castor oil, confection of senna, with a little cream of tartar, sulphur, or confection of sulphur. Strict cleanliness should be observed. The part should be often sponged with cold or tepid water, and an ointment of gallic acid applied. When inflamed the patient should rest, and the part be fomented with an infusion of poppy-heads ; or a leech or two may be applied to the neighbouring part. When strangulated, the part should be pushed back into the bowel when that becomes possible. Frequent bathing with hot anodyne solutions, so as to deaden the sensibility, will hasten the possibility of this operation.

Neuralgia of the face is sometimes very troublesome and severe during pregnancy. It may last during the whole of pregnancy, or be limited to the earlier months. It is due sometimes to bad teeth ; at other times no discoverable cause



can be found. Should there be bad teeth, they should be removed ; but if there be any reason why this operation be deferred, sedatives should be taken to relieve the suffering. These are powerful medicines, and should be taken only by medical advice. Together with sedatives, tonics should be taken : quinine and iron and bark are the best. During the whole of the time the bowels should be kept open.

*Urinary troubles* are very common during pregnancy. There may exist from the commencement to the end of that state a constant desire to pass water, or an involuntary escape of urine. The former occurs during the early, the latter more often during the later, months. In the first case the trouble is due to irritation, in the second to pressure of the large womb upon the bladder.

In the first class of cases the diet should be regulated, malt or spirituous liquors be entirely avoided ; and a few doses of a mild sedative, as extract of henbane (gr. ii.), be taken occasionally ; fomentations are said to be useful.

In the second class, patience must be exercised until pregnancy is over. No local applications or medicines will relieve the condition. Strict cleanliness, however, should be observed. The parts should be frequently sponged with warm water. The thighs and private parts should be well oiled or smeared with zinc ointment, or covered or coated with flexible collodion, to prevent inflammation and excoriation. The bladder should be emptied frequently.

Sometimes, however, there is inability to pass water. In some cases this is very troublesome, and by no means free from danger. The womb presses against the neck of the bladder, and obstructs the outlet. Urine is not passed for many hours, and the bladder becomes much distended ; the distension continuing, a little involuntary dribbling occurs. The woman thinks the bladder is emptied, when in reality the distension is increasing. The cause of this is usually a displacement of the womb. It is a condition which demands immediate treatment.

Dropsy is usually seen towards the end of pregnancy, though occasionally much earlier. It is generally limited to the feet and ancles, or at most to the lower limbs. Rarely, however, it is general, affecting the whole body ; the upper and lower limbs, the face, the back, and abdomen being swollen. In some cases it is very slight, and requires careful observation to detect it, even in depending parts, as around the ancles ; while in others the whole body is greatly swollen. When it is limited to the lower extremities it is due to pressure caused by the enlarged womb. After the womb has ascended out of the pelvis, it, as it grows, displaces the intestines and bladder, and presses upon the parts around. In this way the blood-vessels as they pass through the cavity of the abdomen become the subject of pressure. The course of the circulating fluid in them is obstructed ; the blood in its course from the lower limbs to the heart is impeded, and consequently the feet and ancles become congested, swollen, dropsical. As pregnancy advances this swelling increases, and the legs may attain before labour an enormous size. As soon as labour is over the obstruction is removed, the current of the blood is restored, and the swelling gradually disappears. This form of dropsy is not attended with danger. Another form is that due to disease of the kidneys, or to a poisoned state of the mother's blood. When the kidneys are diseased, and perform their functions imperfectly, certain effete products are apt to accumulate in the blood, giving rise to blood-

poison. During pregnancy this condition may arise, though the kidneys be apparently healthy. The first sign of this state of blood is to be found in the urine. It contains a substance called albumen, which is a part of the fluid of the blood, and of a highly nutritive character, and the filtration of this substance through the kidneys, and its loss by the urine, has a tendency to weaken and enfeeble the system. How pregnancy gives rise to this condition it is difficult to ascertain, and there is some difference of opinion with regard to this point. Some think it is due to pressure of the enlarged womb upon the blood-vessels of the kidneys causing stagnation of the vital fluid in them, as in the vessels of the lower limbs. Others believe that it is owing to poisoning of the mother's blood through the effete products of the child. In whatever manner it is brought about, it is a condition associated with some danger, and should not be for a moment neglected. Whenever the least swelling of the face is observed, medical advice should at once be sought. Besides the inconvenience and discomfort arising from the dropsy itself, certain symptoms, sometimes of a severe character, arise from this state of blood, the most alarming of which are convulsions. These come on in fits or paroxysms. They may come on during the later months of pregnancy, or in the course of labour. They are always associated with danger to the mother, and prove in the majority of cases fatal to the child. The whole body may be affected by them, or only one side. They are accompanied by loss of consciousness, difficulty of breathing, and lividity of face. One fit only may occur, or a series of fits, and as soon as the patient is out of one she may pass into another. They are often preceded by headache, giddiness, nausea, and sickness, shivering, noises in the head, depression, lassitude, and weakness of the limbs. These symptoms should always prove a warning, and should attract the pregnant woman's attention to her state of health.

The *treatment* of such convulsions when they set in is to inhale chloroform. This has proved a most valuable remedy in the fit and against their return. It is administered during the fits in order to cut them short, and at intervals with a view to prevent them. Chloroform is a very safe anæsthetic in pregnant women and during labour, but it should be administered by a person skilled in its use only. At the same time benzoic acid or lemon-juice is given to prevent the formation of an alkaline salt in the blood, which is believed to be due to decomposition of the blood-poison, and to give rise to the fits of convulsions. The bowels should be kept freely open by injections or by purgative medicines, such as jalap, calomel, &c.

During such convulsions labour sometimes comes on, and it should be completed as soon as possible. It may be necessary to accomplish this by artificial help, as turning or the use of instruments, for it has been frequently observed that as soon as the womb is emptied the convulsions cease. This does not happen in all, but in almost two-thirds of the cases. When there are reasons for believing the child to be dead, labour is usually brought on, for the retention of a dead child in the womb is unfavourable to the mother. In some cases the convulsions cease as soon as the womb is emptied, while in others they cease gradually; they become less and less severe until they disappear entirely.

*Displacements of the Womb.*—The displacements of the womb which are met with during pregnancy are similar to those which are seen in the non-pregnant;



and it is probable that the large majority of cases of displacement of the pregnant womb are due to conception taking place in an already displaced womb. It is invariably true of that form of displacement known as falling or prolapsus of the womb, though not of the displacements known as falling backward (retroversion), and falling forward (anteversion).

Falling of the pregnant womb (prolapsus) is the least common of the three forms, and is indeed very rare. During the early weeks of pregnancy the womb is lower than usual in the pelvis, and where the parts have been repeatedly dilated and relaxed by several pregnancies and labours, it is not surprising that in women who have had many children the womb is very low. At the same time it is not often that the womb is so low down as to constitute disease, or to give such trouble that women have occasion to seek advice for it. Sometimes, however, the womb is so low down that its mouth occupies the orifice of the vagina, and, indeed, some cases are recorded where the womb was entirely outside the pelvis. Such cases are of a grave and serious character, but fortunately exceedingly rare. When the womb occupies the pelvis—though lower than natural—it rises about the fourth month, as the organ enlarges, out of the pelvis into the cavity of the abdomen. In this manner the morbid condition is cured. When, however, it is outside the pelvis, great care and management are demanded. Unless it be properly replaced during the early months, reposition will become impossible, and the womb will remain outside until labour is over. Such a condition is attended with very serious risk, and advice should be sought with regard to it at the earliest moment. In simple cases the treatment consists in lying down. In some cases, especially about the third and fourth months, lying on the face is advantageous, for it favours the ascent of the womb into the abdominal cavity. When the womb is outside it should be replaced by gentle means; and the woman should maintain the recumbent position, and wear a T bandage.

Falling backwards (retroversion and retroflexion) of the womb is the most frequent and by far the most troublesome of the displacements of the pregnant organ. The organ falls backward in such a manner as to press on the bowel behind and on the bladder in front. It has been said already that, as a rule, this condition is due to the occurrence of conception in an already displaced womb. This is unquestionably true with regard to the majority of cases, but it is probable that some cases are brought about gradually or suddenly by falls, efforts, lifting weights, straining, and other muscular exertion. The trouble begins usually about the third month, when the womb has attained a size sufficient to fill the pelvis. It is then that the effects of pressure become felt, and obstruction to the evacuation of the bowels and of the bladder is caused. The bladder is not completely obstructed at once, for urine may be passed; but some is always retained, and the organ is never properly emptied. The retained portion becomes decomposed, smells offensively, causes inflammation and ulceration on the inner surface of the bladder; the bladder may become immensely distended, and at last burst, and then the urine flows into the cavity of the belly, causing inflammation and death.

Women may overlook the fact of great distension of the bladder from the fact that urine is constantly dribbling away from them involuntarily, but this is not an

uncommon occurrence when over-distension and paralysis of the bladder are present. In all such cases a careful examination of the abdomen is necessary to discover the condition present, and it may be necessary to pass a catheter to draw the water with the same object. There is also constant desire to go to stool, and often inability to pass a motion. The abdomen grows bigger, and a glance at it shows an educated eye the distended bladder. It is, however, not possible to make out the exact condition of the womb, which lies at the bottom of all the trouble, without an examination of that organ through the vagina. After such examination there is no difficulty in pronouncing upon the nature of the case.

Retroversion of the pregnant uterus is a grave condition, especially if not attended to early. The earliest symptoms indicating such a condition should draw attention, and the cause be carefully investigated. Moreover, in its early stage the condition may easily be removed, while later on it is not possible to do so, or if it be accomplished it is by emptying the womb—a course to be taken only when all others have failed.

The *treatment* consists first in emptying the bladder. A catheter should be passed, and the urine drawn away. Then clysters of soap and water should be administered so as to empty the whole of the larger bowel. Having done this, the woman should lie on her face, and the uterus will in some cases ascend spontaneously; but this happens rarely, and it becomes necessary to lift the body of the womb so as to help it out of the pelvis. This is a very delicate operation, and requires a skilled hand. Sometimes all attempts at reducing the displacement fail, the body of the uterus being too large, or having become bound down by adhesions to the neighbouring tissues of the pelvis. Under these circumstances it is necessary to reduce the size of the uterus, or to empty the organ.

Death has occurred in some cases, and in some cases even after reduction has been effected, or after abortion has been procured. Hence the urgent need of early attention in all cases where there is retention of or difficulty in passing urine.

There are two or three cases on record in which a woman with a womb fallen back (retroversion) has gone to the full term of pregnancy, and after very prolonged labour has been delivered. Such, however, is not the usual termination; it is abortion and recovery, or death from inflammation and blood-poisoning.

Falling of the womb forward (anteversion) is the usual condition after the second month. By assuming this position the organ rises into the cavity of the abdomen. The treatment consists in rest on the back.

Discharges of a watery or of a thick yellowish fluid from the vagina are exceedingly common during pregnancy. It sometimes causes much discomfort, a burning, tingling, or constant itching about the private parts.

It should be treated by observing strict cleanliness, a tepid bath twice daily, regulated diet, and total abstinence from stimulants. The bowels should be regulated by mineral waters or sulphur, confection of senna, &c. After the use of the tepid bath an injection consisting of Goulard water or a weak solution of acetate of lead should be used; the parts should then be carefully dried with a soft cloth. If there be general weakness, steel or acids and bitters will prove useful.

Discharge of blood during pregnancy is almost invariably a serious symptom.



As a general rule, it may be said that with the exception of those cases in which menstruation takes place for a few times during the early months of pregnancy, hæmorrhage from the pregnant womb is not unaccompanied by danger; there are a few cases in which disease of the womb itself gives rise to bleeding during pregnancy. These cases are not of very common occurrence, and we will confine our remarks in this place to flooding arising from something unnatural in the pregnancy itself.

Flooding, then, is frequently the first signal of abortion. This may occur at any period of pregnancy. Threatened abortion may often be warded off, and the woman recovers and goes to her full time. Abortion is the result of disease or of accidents. Very slight accidents will give rise to it in some women; and women who have aborted once or twice get into a habit of doing so, and it is difficult to make pregnancy proceed to the full term in them.

Later on, during the later months of pregnancy, flooding of this kind is called accidental hæmorrhage. It is due to partial separation of the after-birth from the womb, and often causes premature labour. It is caused by accidents, as falls, blows, fright, &c., and by disease of the after-birth.

Another form of flooding is what is called "unavoidable hæmorrhage." No accident produces this. Its occurrence is a matter of necessity after the fifth or sixth month of pregnancy. It occurs oftener in women who have had several children than in those who are pregnant for the first time. It is due to the fact that the after-birth is misplaced (so to speak), for it is situated over the neck of the womb instead of being attached to the upper part of the body of the organ.

All cases of hæmorrhage during pregnancy are of a very serious character, and they tax to the highest the skill of the most expert. Medicines and plugging are of but little use. Absolute rest in bed is essential; cold may be used, and in some cases anodyne may be given, but only in cases where the patient can be frequently seen by the doctor—and every case of flooding should be frequently seen. Should the hæmorrhage continue, labour should be brought on, and the womb quickly emptied.

It is evident that pregnancy is a state which is attended with no little anxiety; and that the woman who is pregnant should be the object of earnest solicitude and kind attention.

The numerous sympathies manifested at this time between other organs and the uterus—as the breasts, stomach, kidneys, nerves—all of which, when moderate in degree, are normal, yet even then they are a source of trouble and discomfort. But when they attain a morbid degree, what terrible inflictions they become! Towards the end of pregnancy still greater claims has woman upon our tenderness, for then she is often a burden to herself. It should never be forgotten that pregnancy gives rise to alterations in disposition, and increases the general susceptibility; that it sometimes makes the most amiable irritable, the self-denying indulgent, and the cheerful despondent. "The respectful deference which is commonly shown to women in civilised countries at all times, is now therefore more especially demanded; while a little forbearance and feeble persuasion will do much more than rudeness or harshness in making the future mother conceal any infirmity of temper, as well as in enabling her to preserve a calm and cheerful deportment."

## CHAPTER XIII.

## MISCARRIAGE OR ABORTION.

## Causes of—Symptoms of.

By abortion is meant expulsion of the embryo from the womb before the seventh month of pregnancy ; when it takes place between this period and the ninth month it is called premature labour. Both are of very frequent occurrence. When expelled before the end of the seventh, the embryo, or child, is already dead, or dies soon after birth ; when after, it may live and be reared. Abortion is said to take place more frequently in first pregnancies than in later ones, for what reason it is difficult to find out. On the other hand, there is some evidence to show that they occur more frequently in later pregnancies, and in conceptions occurring about the dodging-time. A pregnancy about this period is an anxious time to the subject of it.

The causes of abortion are very numerous. They may be divided into diseases affecting the mother's health, diseases of the embryo, and accidental causes.

*Diseases of the Mother.*—Acute disease and fevers, as inflammation of the lungs, typhoid or scarlet fever, or small-pox, not uncommonly give rise to abortion. Though this is the general rule, yet it is by no means without exception, for women pass through severe attacks of the acute fevers, and go to their full time—pregnancy not having been in any way interrupted.

*Constipation*, either from natural inaction of the bowels, or from pressure upon them of the pregnant womb, gives rise during the early months of pregnancy to such violent straining as to induce the womb to expel its contents. The presence of hard masses of fæces in the intestine alone is often enough to irritate the womb, and excite it to contraction, which may end in miscarriage.

*Skin diseases* are occasionally the cause of abortion, especially when they give rise to great and intolerable irritation.

*Inflammation of the uterus* itself, and of the tissues around it, sometimes causes miscarriage. In this case the womb is bound down in the pelvis by firm bands. As pregnancy proceeds, the uterus becomes larger and softer ; the tissues around participate more or less in the changes which the womb passes through, and become more yielding and soft ; but in some cases they possess too great a resistance to permit the womb to rise and escape into the cavity of the abdomen when it has become too large to be contained in the pelvis. Unless they give way, or yield, abortion will take place ; but on the other hand, should the womb be permitted to escape into the cavity of the abdomen, pregnancy will go on uninterruptedly.

Displacement of the womb is another cause of this trouble. These affections have already been described. The danger of abortion arising from them is about the third or fourth month, when the womb goes up into the abdominal cavity from



the pelvis. It is true that they frequently give rise to many troubles before this time, and that they have given long warning of their presence, yet it is now that they put forth all their strength, that the troubles which they cause reach their highest danger. These displacements may have existed previous to conception, or they may have been brought on since.

Retroflexion does not absolutely prevent conception, and the pregnant uterus also may be retroverted during the early months of pregnancy by the straining which often occurs when the bowels are obstinately constipated. When this happens, there is a sudden severe pain in the abdomen; the neck of the bladder becomes pressed upon; and as the womb grows the urinary passage becomes quite obstructed, so that there is complete retention of urine with all its evils. The womb occupying the abnormal position becomes greatly congested, increases in size, presses against the walls of the pelvis, and being unable to escape into the cavity of the abdomen, contracts upon its contents and expels them.

Falling down of the womb rarely gives rise to abortion, but falling forward is said to cause it very frequently, considering the rarity with which the anteverted womb becomes impregnated.

Fibroid tumours of the uterus, ovarian tumours, or other tumours of the abdomen or of the pelvis; disease of the lungs, liver, heart, and kidneys; convulsions, whether they be hysterical or epileptic in character; a nervous temperament, or full-bloodedness (plethora); lead-poison or blood-poison of any kind may cause miscarriage.

*Diseases of the Embryo* which produce abortion.—The unborn infant is liable to disease just as the newly-born is. At any period of pregnancy it may become the subject of disease, and it may perish in consequence or live to the full time. Diseases are hereditary, just as well as facial and bodily lineaments; and the diseases of the father and mother may be transmitted to the child, and while still in the womb it may show signs of them. During the early months the intestines and liver are apt to suffer; later the brain, the glands, the lungs, the chest, heart, blood-vessels, and abdomen.

During the later months of pregnancy the unborn child may suffer from almost any disease which the newly-born may be subject to. If the mother suffer from acute fever, cholera, consumption, or scrofula, the child may suffer from the same. Children have been born with measles or scarlet-fever rash upon them.

The after-birth is also subject to disease, which may destroy the child and produce abortion; or it may become partially separated from the womb, which, as a rule, results in flooding, and ultimately in miscarriage.

When the child dies in the womb, it is not, as a rule, expelled at once, but is retained for several days—from six to twenty. During this time there is some uneasiness, and perhaps signs of threatening abortion, and it is important to know whether the child is alive or dead. If the child is dead, the mother does not longer feel its movements; she does not increase in size, but there is a sense of coldness in the belly—a heaviness in the bottom of the abdomen; the breasts do not grow—lose their roundness and firmness, and they become loose and flaccid. If there be a fetid discharge it is almost certain the child is dead. It is exceedingly

difficult to make sure of the death of a child in the womb, because the distinctive signs of life, as the sounds of the heart, may be missed, though the child be alive; and when the child is dead all the above symptoms may be absent.

False conceptions, as the flesh and grape mole, have been described, and we need not do more here than refer to them as causes of abortion.

*Accidents.*—The most common are violent bodily or mental shocks, fright or grief, fatigue, blows, falls, riding, jolting, driving, dancing, violent diarrhœa, may cause abortion. It is surprising what little is enough to cause abortion in some women, and how difficult it is to get the womb to expel its contents in others. Severe injuries, heavy falls, violent attempts even at destroying the fruit, have in many cases completely failed to excite the organ to act. There is hardly an injury compatible with life—danger however great, excitement however powerful—which pregnant women have not suffered without evil effects.

It is said that some women acquire the habit of aborting. By this is meant that if a woman aborts once or twice she is very likely to do so again. In these cases there is something more than habit, and if the womb be carefully examined it will be found that it is in an unhealthy condition. It may be that it has not had time to recover from the first pregnancy and labour before the second conception takes place; the organ may be inflamed or ulcerated; in any case, however, some condition is present which is unfavourable to healthy pregnancy.

*Symptoms.*—The symptoms of abortion during the later months are similar to those of labour; at an earlier period they depend upon the degree of development which the embryo has attained. If it occurs a week or a fortnight after the first absent period was due they will be little more than those of menstruation—a little more discharge, a few clots, and a little pain. The symptoms vary in severity between these extremes. We stated elsewhere that a periodical discharge of blood occasionally takes place during pregnancy: this should not be mistaken for the commencement of abortion. It is true that abortion frequently begins with flooding, but there is usually also pain in the abdomen. On the other hand, there is no pain in the former case, and the discharge is not profuse. Whenever bleeding occurs during pregnancy—whatever be its cause—the woman should rest in bed.

Women are apt to treat a miscarriage as if it were a matter of little or no importance; they frequently walk about, follow their occupation, and do their work during the whole time. Now it should be known, that though a miscarriage may be associated with little danger when properly attended to, yet when treated without due care and attention it may not only lead to endless troubles, and lay the seeds of many diseases, but may even prove fatal.

Whenever miscarriage is threatened, when bleeding sets in, all the discharges should be carefully kept—no clots or substances should on any account be thrown away; they should all be preserved until the visit of the doctor. They should be shown to him, for from them alone he can form an opinion whether “everything has come away” or not.

Unfortunately, women constantly act in the very reverse way; as soon as anything is passed it is carefully thrown away so that it cannot be seen again; it can safely be said that by so doing they do their best to prevent the doctor doing



his best. By the examination of the substances passed, if they were all preserved, the medical man could easily say if there was any more to come away, and in this way decide what measures are needed.

The risk of leaving a portion of the after-birth behind in abortion is even greater than after labour. In the latter case, the danger is slight; it occurs daily, and usually the contractions of the womb are alone enough to expel it. In abortion, however, the contractions of the womb are feeble; the after-birth has not undergone the preparatory process for separation; it is firmly attached, and not easy of removal. After everything has come away a time of rest is required for the womb to return to its ordinary condition, just as it is necessary after labour. Absolute rest should be observed until all red discharge has stopped and for some time after. The observation of this counsel alone will save much future suffering; for there is nothing more productive of uterine diseases than carelessness during abortion.

At this time the diet should be good, but plain—meat, vegetables, bread, milk, and beef tea. Stimulants are not, as a rule, necessary. If there has been great loss of blood, however, they may be urgently needed. The bowels should be regulated. The breasts give no trouble, for little or no milk will appear in them.

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## CHAPTER XIV.

### THE MANAGEMENT OF PREGNANCY.

#### Food—Clothing—Baths—Exercise—Sleep.

WHEN a woman has conceived, her chief object and desire is and should be a healthy pregnancy and a safe labour. With this object in view, she should be watchful over everything that can affect or influence her physical, mental, and moral health and development; on this depends not only her own but her offspring's health. The food should, during pregnancy, be plain, and in sufficient quantity. Sometimes, as has been already stated, the appetite is lost or becomes degraded after conception, and there is a desire not simply for innutritious but for positively injurious substances. Now, the fancies of pregnant women should, as far as possible, be gratified; but there is a limit beyond which complaisance should not go: that limit is reached when injurious substances are desired as food. They should be refused, however painful it would be to do so. At the same time, great latitude should be allowed, because food which is indigestible is sometimes digested, in others vomited. The food, then, should be plain, nourishing, and abundant—meat twice a day, bread, vegetables, milk, and fruit pudding, unless the latter disagree.

Stimulants under ordinary circumstances are unnecessary; at least, no increase of them should be made on account of the conception. If the patient be accustomed

to take small quantities of ale, claret, or wine, she may continue to take them to the same amount ; but when water has been the usual drink it is best that it continue so. It will have a favourable effect both on the mother and the child's health.

There may arise, however, circumstances which demand the use of stimulants, as acute disease setting in, or a profuse loss of blood, or other exhausting condition. In such cases stimulants should be taken under medical advice.

*Clothing.*—All women wear stays, and it is right that they should do so. During pregnancy they should not be left off, but should be made in such a manner as to fit to the altered figure. Some women, without reason, appear as if ashamed of a condition which they are only proud of, and attempt to conceal the fact of their pregnancy for as long a period as possible. This is effected by tight-lacing, a practice that is most injurious to themselves and the child. It is to be deprecated and condemned, and there is no single reason in its favour. It arises entirely from a feeling of false delicacy, which a person who aspires to become a mother should not indulge in. On the other hand, stays are of great service when properly made. As pregnancy advances and the womb increases in dimensions, great pressure is brought to bear on the walls of the abdomen ; the skin is stretched and cracked ; the muscles and all the tissues are put on the strain ; there is often severe pain in the lower part of the chest, owing to the dragging upon the ribs in the places where the muscles are inserted. A properly-made belt or stays bring considerable relief to these troubles. Such a stay should be moulded to the body, should not be stiff, should embrace the whole of the abdomen so as to give it equable support, and should have strong elastic at the sides, so that it may yield when necessary.

Flannel should be worn next the skin in summer as well as winter. It is at all times better than linen. The thickness of the material can be regulated to meet the peculiarities of the individual and the changes of the seasons. More or thicker clothing is generally required during pregnancy than at other times, owing to the increased nervous sensibility and susceptibility to disease.

Drawers of flannel should be used ; they are better when they open on the side, and with elastic below the knees. In this way perfect protection from cold and draughts is insured.

Garters should be worn as little as possible. There is great tendency during pregnancy to the distension and enlargement of the veins of the legs, owing to the pressure from the enlarged womb impeding the return of the blood from the lower limbs to the heart. Every effort should be made to relieve this, and ward off whatever has a tendency to aggravate this condition. Garters, especially when worn tightly, appear to favour the distension of the veins. It is, of course, not possible to do entirely without the aid of garters ; at the same time, there are many hours of the day, or even many days, when their use can be dispensed with altogether by she who is *enceinte* ; and by discarding them as much as possible, and by never wearing them tight, it is in some cases possible to save oneself infinite trouble and great pain.

*Baths.*—Many, if not most, ladies nowadays take their daily sponge bath. In many cases it is cold, in others it is tepid. Both are useful, and should not be discontinued during pregnancy.



*Exercise* is necessary to the enjoyment of health at all times. Pregnancy is no exception to this rule; and every day she who is in the family way should take a "constitutional." Indeed, it is perhaps more necessary during this period than at any other time. Care, however, should be taken not to overdo it. Violent exercise which calls the muscles into forcible action should be avoided, as riding, rough driving, dancing, &c. Violent efforts, as over-lifting or straining, should be avoided. Long walks, causing great fatigue, should be forbidden. Quiet driving, but, best of all, walking exercise is to be recommended: a short walk morning and evening, and a third at noon, if not too fatiguing. This favours digestion and nutrition; promotes the change of material in the body; favours circulation, which during pregnancy becomes sluggish, and causes enlarged veins, swollen legs, and bleeding piles.

*Sleep*.—The amount of sleep that different people require varies greatly. Some can do with four or five hours a night, while others can hardly do with less than eight or nine, and could even enjoy twelve. During pregnancy early hours should undoubtedly be rigidly observed in the evening; in the morning, however, a longer rest than she is accustomed to will often prove very grateful to the feelings of the future mother, and she should not be denied the indulgence. During the day she should rest several hours, and always with the feet on a level with the buttocks.

Great care should always be taken in guarding against accidents to pregnant women: not only falls, blows, and direct injuries, but also sights or news, &c., which are likely to cause a sudden shock. Repulsive objects should be kept from view. This is not because they are likely to brand the child with what are called "Mothers' Marks," but because they may produce fits or hysterical convulsions; or a sudden shock may destroy the child, or bring on miscarriage, at any period of pregnancy.

## CHAPTER XV.

### THE MANAGEMENT OF LABOUR.

The Period immediately following After-pains—Secretion of Milk—Excessive Secretion of Milk—Deficient Secretion of Milk—Deformed Nipples—Sore Nipples—Milk Abscess.

SOME time before labour actually sets in premonitory symptoms or warnings of it have been observed. The first of these is the falling or sinking of the womb, which takes place during the last month of pregnancy. This is almost invariably observed. Women say that the child is lower—that they do not feel so uncomfortable, so full and distended. This is because the pressure of the womb is in part removed from the chest, and there is in consequence more breathing space. Other troubles, however, appear: the bladder becomes more irritable, micturition is more frequent, and the bowel may be irritated so as to give rise to slimy or mucous diarrhœa. Walking also is performed with greater difficulty;

there is a general preparation in the pelvis for the birth of the child. All the tissues become softer, and the firm joints which bind its several parts together appear to become looser and more yielding. The first symptom of real labour is pain. This is due to efforts made by the womb to expel its contents. The pain is seated at first in the abdomen, and is similar to sharp colic. Pains similar to these may come on several days—even a week or more—before labour. They sometimes return every night and cease in the day. They are then due, in the majority of instances, to some deranged condition of the stomach and bowels, as constipation, or the ingestion of indigestible food. Such a condition at all times, and especially during pregnancy, is apt to give rise to pain in the womb. A dose of castor oil or Friedrichshall water will empty the bowel and dispel the pains. When labour really sets in, the pains return at intervals. At first the pains last a very short time; they are little more than sharp twinges, with long intervals between them. The pains gradually become longer and more severe, and the intervals shorter. After a time, the pains, instead of having a colicky or twinging, assume a bearing-down character. They go to the back, and then the woman has more suffering in the loins than anywhere else. She calls the nurse to press or support the back, and this gives great relief.

As labour advances, a discharge makes its appearance from the vagina. At first it is a pale or colourless viscid mucus. The quantity of this secretion varies: in some cases it is very profuse, while in others it is scanty. A large quantity of it is generally regarded as a sign that the labour will not be a long one. After a time, when the labour has made some progress, what is called the “show” presents itself. This is a slight discharge of blood, and indicates the advance made by the child’s head. It is a sure sign that labour is progressing. About the same time the patient may feel chilly, or have a slight shiver or rigor. This is of frequent, indeed, of usual occurrence, and should be expected in the natural course of events. Another occurrence of great importance which takes place about this time is the rupture of the membranes and the escape of the waters. The amount of water which escapes varies much in different cases. The quantity may be immense, or it may be trifling. The latter condition may be due to one of two things—retention of a part of the fluid in the womb, or an originally small amount of water. With the escape of the waters the pains alter in character. Before this event the pains were of a teasing, colicky character; afterwards they become stronger, of longer duration, and of a bearing-down character. The severity of the pain varies much. Some persons suffer but little, while others suffer severely. The pains gradually increase in severity until the head is born; then there is a short interval of relief, after which the body is expelled. When the child is completely born, the nurse (if a doctor is not present) should keep her hands on the lower part of the abdomen, just above the pubes, or below the navel. Then she ought to feel a hard, round, smooth mass, like a cricket-ball or a child’s head: upon this she should lay her hand flat, and hold it firmly down. It is the contracted womb which should be maintained in a state of contraction, and not allowed to become relaxed. There is no great hurry about the child, so long as its mouth is kept out of the discharge with which it is surrounded, and it is able to breathe. When the mother has been

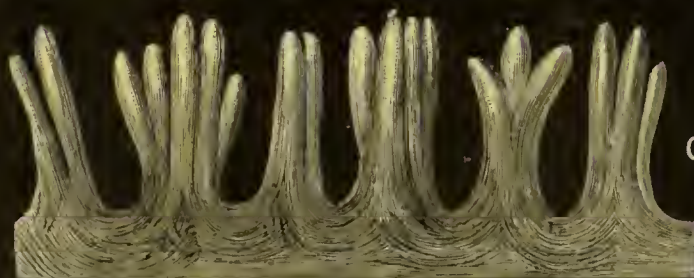




B



A



C



E



D

### PAPILLÆ OF THE SKIN.

- A. Magnified view of the epidermis, from the palm of the hand, showing the ridges coated by rows of papillæ beneath, and the sweat-pores.
- B. Vertical section through the skin of the hand, magnified about 20 times. (*After Kölliker.*)
- C. Compound papillæ from the palm of the hand, magnified 60 diameters. (*After Kölliker.*)
- D. Section of ditto, further magnified, showing the blood-vessels, the nerves, and touch corpuscles. (*After Sappey.*)
- E. Touch corpuscle, yet more enlarged, and showing nuclei.





duly attended to, the child should be separated ; this is called by some midwives, "taking the child." The navel-string or cord should be tied in two places by means of tape or of strong thread. The first ligature should be placed about an inch and a half or two inches from the child, and the second an inch or an inch and a half beyond the first. The navel-cord should be then divided with a pair of scissors between the two ligatures. Care should be taken that the cord is the part really divided. The object of the ligatures is to prevent bleeding. The really important one is that next the child, for if it be not properly and firmly tied the infant may bleed to death. The second is of no great importance, though it is usual to put it on.

The child having been separated, the next object is the removal of the after-birth. This is usually expelled in the course of half-an-hour after the birth of the child by the efforts of the uterus alone ; and no attempt should be made to remove it except by one thoroughly acquainted with the method of doing it. Nurses and midwives are often greatly afraid that the cord may be drawn up into the womb, and in order to prevent such an untoward occurrence they tie it by means of the ligature-string to the patient's thigh or leg. This is a harmless practice enough ; at the same time, we must say it is absolutely useless, for it is not possible for a navel-string of moderate length to be entirely drawn up into the womb ; and even were such an accident to occur it would result in no harm whatever. Were this the only interference of which ignorant attendants are guilty it would be indeed well ; but, unfortunately, attempts are frequently made to remove the after-birth by dragging on the navel-cord. Such attempts are exceedingly mischievous, and may lead to the gravest injury. Every now and then the cord gives way, and the after-birth is left in the womb. When this has happened, a doctor is sent for, and the removal of the organ is by no means to be easily accomplished. In other cases the cord does not yield, but the uterus is turned inside out by the dragging upon it. This inversion of the uterus is a most serious accident, and imperils life ; indeed, it has proved in some cases immediately fatal. But pulling at the cord leads to other less serious but very troublesome consequences. It irritates the womb, excites it to irregular contractions which do not expel the after-birth, and renders it difficult for it to be removed artificially.

When waiting for the expulsion of the after-birth, it should be remembered that the navel-string should not be pulled upon ; that the hand should be kept on the abdomen just above the pubes, in contact with the womb ; that whenever the round tumour, like a cricket-ball, loses its hardness and firmness, and becomes soft and flabby, there is danger of bleeding ; and that, in such circumstances, gentle rubbing and pressure, or kneading, should be practised over the part until the womb becomes hard again.

No medicine should be given during labour, unless ordered by a doctor, nor until after the expulsion of the after-birth. After birth is completed—that is, when both the child and after-birth are born—a draught, containing a tea-spoonful of the liquid extract of ergot of rye in a little brandy and water, may be given if there be any signs of flooding. In no case should ergot be administered before the birth of the child.

The management of the lying-in room is of no little importance. When the

event is expected, everything should be in readiness : the doctor should be engaged and known, and the nurse should be in the house a day or two before, if possible. The baby's clothes, napkins, binder, mackintosh, draw-sheets, and all the little things that will be necessary to make both the mother and child comfortable, should be procured ready before the expected time. It is well to have all this done some time before the calculated time of labour, because now and then the baby arrives a fortnight or three weeks before it is expected. The lying-in room should be quiet ; there should be no more than one friend, and that one a mother, if possible. The husband is better out of the room. In the room these three should be together with the patient : the doctor, the nurse, and one friend. The choice of a nurse is as important as the choice of a doctor. It is sometimes well to engage a nurse at the recommendation of the doctor in attendance ; she should be intelligent, sober, wakeful, and should thoroughly understand her business ; she should not be meddlesome. Of all nuisances in a lying-in room, perhaps an interfering nurse is the worst of all—both to the patient, her friend, and the doctor. She should observe the directions of the doctor accurately ; observe the patient carefully, and report accordingly to the medical man in charge.

After confinement the patient is worn, tired, and exhausted. "A temporary calm follows the energetic action which issued in the delivery of the mother. After the excessive action, in which nerve and muscle seemed strained to the utmost pitch, there comes a sudden and profound repose ; there is perfect freedom from pain ; every fibre is relaxed ; only the uterus now contracts of all the muscles which were so lately struggling. Like some ship which turns from a tempestuous sea into a safe and quiet harbour, the young mother passes from the storm of child-birth into the tranquil haven of maternity. In the pathetic words of Scripture—'A woman, when she is in travail, hath sorrow, because her hour is come ; but as soon as she is delivered of the child, she remembereth no more the anguish, for joy that a man is born into the world.'"

Absolute rest is now necessary. For the first few days the new mother should see few or no friends. The room should be darkened and kept perfectly quiet, so as to favour the induction of sleep.

During the month that follows labour great and important changes take place in the lying-in patient, and everything should be done in order to favour the regular and normal performance of these changes ; for upon this the future health of the woman may in a great degree depend. Moreover, slight causes may interfere with them, and may give rise to the beginnings of disease which may easily be prevented, but which is with the greatest difficulty cured when once it has lodged itself in the womb.

The chief changes which occur during this period are the involution, or the reduction of the womb from the enlarged condition in which it is immediately after labour to the normal size of the organ in its unimpregnated state ; and the secretion of milk in the breasts.

In order that these processes may go on in a proper manner, there are many conditions which should be observed, which we shall mention as we proceed. And, first of all, we will speak of the food of the lying-in woman.



It was once believed, and is still too generally held, that the lying-in woman should be kept low for the first few days after labour. It was thought that she was in a condition peculiarly liable to inflammation, and that good nourishing food was likely to excite that formidable disease. This, however, cannot be maintained; insufficient food is far more likely to retard recovery, and to interfere with the normal processes going on in the body. Instead of limiting the diet to tea, arrowroot, and water-gruel, a nutritious but easily digestible and unstimulating diet should be taken: as beef tea, chicken soup, &c.; not discarding entirely, however, the old *régime*. Except in special cases, stimulants — wine, spirits, and beer — are unnecessary.

The binder should, for the first three days, be carefully adjusted. It is liable to slip up under the arm-pits or round the lower part of the chest, where it is of no use: when this happens, it should be taken off and replaced in the manner already described.

After labour the bowels are generally confined: this is especially the case when they had acted freely just before or during labour. In such cases it is not necessary to be anxious about them for the first two days; on the third day, however, if they still remain torpid, it is advisable to give a dose of castor oil or other mild laxative. When they have been freely acted upon, the patient may return to her ordinary diet. About this time the milk begins to form in the breasts, and the mother has to take food, not only for herself, but also for her infant. There is, consequently, an increasing demand for nourishment, and the food should be plain and good, but abundant: animal food twice a day, with vegetables and bread, and the usual amount of beer or wine.

For some days after childbirth there is a discharge of blood from the womb. At first this contains coagula or clots of blood. These disappear after the first day or two, but the sanguineous discharge lasts for seven or eight days. It is at first almost pure blood, but after the first three or four days it begins to lose its colour, becomes paler and paler until about the eighth or tenth day, when it assumes a greenish colour (then it is called the green waters), and disappears from the twelfth to the fifteenth. This discharge is passed in greater quantities during micturition, or at stool, or during after-pains. It is necessary that the discharge should be free, but not profuse. A discharge of blood sometimes continues during the whole month; then something wrong should be suspected, and should be at once attended to. While the discharge continues, napkins should be worn and changed frequently; and at each change the parts should be carefully sponged with warm water, so as to preserve perfect cleanliness. This is imperatively demanded, for the secretions are liable to undergo rapid decomposition and become offensive. Should the discharge become offensive in the passages, it may be necessary to wash them out twice or thrice a day, by means of injections of warm water containing a little Condyl's fluid.

*After-pains.*—After the womb has expelled its contents, it remains in a more or less contracted condition. This contraction, however, varies in a degree at different times. Sometimes the organ contracts more vigorously and then relaxes again. These contractions are accompanied by pain—called after-pains. Their occurrence

is a natural phenomenon, and up to a certain point they have a beneficial influence, and favour the changes which take place in the womb. They are absent, or more generally slight, in first cases, and increase in severity with each successive labour, so that in a woman who has had many children they may cause much suffering.

They begin soon after labour, and continue in some cases for three or four days, and may require special treatment. A warm poultice or a hot flannel over the lower part of the abdomen will frequently give relief.

They are aggravated by putting the child to the breast, by taking food, by the action of the bowels or of the bladder, or by distension of the last-named organ.

Rest is of the greatest importance in the early part of the lying-in month. The patient should remain in bed for ten or twelve days, and in some cases even longer. Then she may sit up, and rest on the couch or on the outside of the bed, but it is advisable for her not to leave her room until the third week; and she should rest for a great part of each day until the end of the month. This should be the rule; there are exceptions when still longer rest would be beneficial. Too early getting up is productive of numerous troubles; it may give rise to a profuse bleeding, or keep up a sanguineous discharge for weeks, or even months; in many cases it is the cause of sub-involution of the uterus, with all its troublesome consequences--to falling of the womb, to relaxation of the soft parts around the uterus and of the floor of the pelvis, and to other forms of displacement.

*Secretion of Milk.*—We have already stated that changes in the breasts form part of the signs of pregnancy. These changes become more marked as pregnancy advances, and attain their maximum a few days after the child is born, when the milk has become freely secreted. During the last month of pregnancy milk is found in the breasts in small quantity, and can even be pressed out from the nipple, but the proper secretion of milk takes place in most women about the third day after labour. At this time the breasts become rapidly harder, fuller, and painful: there appears to be a rush of fluid into them; the patient feels ill, feverish, has a headache and a quick pulse. In some cases there is a slight shiver, or rigor, hot skin, a free perspiration, and there is free secretion of milk in the breasts. This is called “milk fever.”

It is a question of some importance when the child should be put to the breast. Should it be put early, during the first two or three days, before the milk is fully secreted? or is it better to wait until the breasts are acting freely? There are several advantages in applying the child early. Irritation of these organs causes the womb to contract, causing it to expel clots that may be lodged in its cavity, and favours involution. It undoubtedly also favours the flow of milk into the breasts, so that in cases where milk is scanty this is one method of increasing it. It also draws out the nipple when this is flat or small; “and what is now likely to occur, should this have been omitted, is a projection of the areola which participates in the tumefaction of the rest of the gland, so that the nipple falls in, as it were, on a level with the skin, when it becomes a matter of some difficulty for the child to seize it.”

After a first labour, when the milk is secreted, the child may find some difficulty in drawing it out along its fine channels; and the pain arising from it to the mother



may be severe. In such a case it is advisable for the nurse, or some fit person, to draw the breasts herself or by means of a breast-pump. Once the milk flows freely out of the nipple, this pain is relieved. Besides, as the child requires but little at first, the breasts are frequently but imperfectly emptied by its efforts, then gentle rubbing of the harder parts of the gland with olive oil will cause the milk to flow out, or the breast-pump may be used for the same purpose. During this period the heat in the breasts is great, and in parts they become hard and cord-like; in such cases it may be necessary to keep evaporating lotions constantly applied to them. The best is an ounce of spirits of wine to eight ounces of water. When the organs become troublesome, on account of their size and weight, they should be suspended by means of silk handkerchiefs tied over the neck.

Under these circumstances, the child must not be too frequently applied to the breasts. It is better to relieve the distended organs by completely emptying them by means of the pump, for the irritation caused by the imperfect efforts of the infant increases the troubles.

The milk first formed in the breasts is thicker than that formed when the flow is well established; it has irritating properties, and serves as a purgative to the child, acting freely on its bowels. It loses this character in the course of two or three days, and acquires the properties of the mother's natural milk.

The quantity of milk formed in the breasts of different women varies greatly. In some it is so abundant as to flow out spontaneously from time to time, while in others the breasts are absolutely dry. In the first case, the woman is said to be a good nurse; in the latter, a bad, or rather, no nurse. Besides the difference in the quantity of milk secreted, there is also considerable variation in quality met with; and, in reality, the value of any one as a nurse depends, not on the quantity of milk secreted in the breasts only, but also upon its quality.

*Excessive Formation of Milk.*—This gives rise, occasionally, to serious troubles. The milk may be of good quality or of a watery character. When the milk is good, the child does not suffer—it thrives; but the inconvenience to the mother is not inconsiderable. The secretion is so rapid that soon after the breasts have been emptied they fill again, and suddenly pour out their secretion, keeping the mother's breasts in a perpetual state of moisture.

The breasts are so irritable that the least touch gives rise to an overflow of milk; and when the child is applied to them they pour their contents out more rapidly than the child can swallow, filling its mouth, and giving rise to a choking feeling. When this is allowed to go on for a long time, the drain affects the mother's health, and may ultimately undermine her constitution.

In such a case the chief object should be the regulation of the diet. The food should be good and plentiful; but it should be chiefly solid. The amount of fluid taken should be very limited.

*Deficient Secretion of Milk.*—The secretion in the breast may be scanty or absent. The quantity varies between the extreme abundance described in the previous paragraph and none. Absence or deficiency of milk may occur in women who are perfectly healthy. It is not often seen under those circumstances, but usually in women who suffer from acute disease. It is one of the first symptoms of those

diseases to which the lying-in patient is subject. The breasts in these cases become distended and full about the third day, and milk is abundantly secreted; and about the fourth or fifth day, when the disease sets in, it becomes greatly diminished or entirely suppressed. The discharge from the womb is also arrested. These two symptoms appearing together are of very serious import. On the other hand, when there is deficiency or absence of milk in good health, the cause rests in the particular constitution of the patient, and secretion fails from the first: and in these cases the only evil that follows is the inability of the mother to nurse her child.

*Deformed Nipples.*—The nipples are sometimes small or flat, so that the child cannot suck. This may be due to original conformation or to the pressure of badly-made stays. This is frequently a source of great trouble and annoyance. The mother has plenty of milk and is anxious to nurse her child, but experiences the greatest difficulty in doing so, owing to the imperfect shape and size of the nipple. The child cannot take it into its mouth and retain it there with ease, and, consequently, bites and bruises it. To remedy this, efforts should be made to draw out the nipple. These should be tried after labour and before the milk has come into the breasts, and continued afterwards. The child may be applied; and should this prove ineffectual, the services of a sister or nurse should be obtained. If this cannot be obtained, then an attempt should be made to draw it by a pump. The following simple method answers well in some cases:—Take a soda-water bottle, or a bottle of similar shape and size; fill it with hot water; pour the water out, and apply the neck of the bottle over the nipple; as the bottle cools, the partial exhaustion formed by the condensation of steam will cause the nipple to protrude and be gradually drawn up into the neck of the bottle. When this is effected, the bottle should be retained in that position for a few minutes, and then tilted a little on one side, while the breast is pressed on the opposite side so as to allow air to enter the bottle, and the nipple be withdrawn without injury.

India-rubber teats, or artificial nipples, are of great service in these cases; and they will enable any mother who has plenty of milk, and is anxious to nurse her infant, to do so, whatever be the shape of the nipple. They can be obtained at the druggist's. They should be made of the natural black india-rubber, for it is practically devoid of taste; while the white india-rubber, or caoutchouc, has a sickly and unpleasant taste and smell.

*Sore Nipples* are very common, and very troublesome and painful. It is often not easy to cure them, on account of the frequent application of the child to them in nursing. When cracks or fissures, and excoriations are present, every application of the infant aggravates the suffering.

They are easier of prevention than of cure. During the later months of pregnancy they should be frequently bathed with salt and water, or a weak spirit lotion, or an infusion of tea. After labour, and during the period of nursing, the same treatment should be continued. If this proves ineffectual, a lotion of Goulard water, or, better still, glycerine tannin, should be applied after each application of the child. Extreme cleanliness is necessary under these circumstances, for the sake of both mother and child. The nipple should be bathed with



warm water after each act of suckling ; then carefully dried, and the application applied afterwards. This should be allowed to remain until the next act of suckling, when the nipple should again be bathed with warm water, so as to remove all trace of the lotion before the child is put to the breast again. In some cases the nipple is so painful, and the irritation caused by suckling so great, that it becomes necessary to remove the child permanently and bring it up by hand, or obtain the services of a wet nurse.

*Milk Abscess.*—This may occur in any case in which there is a fair quantity of milk secreted. It is said to occur more frequently in the weakly and delicate than in the strong and robust. The breast at first is full ; a part of it remains hard and tender after the gland has been emptied. There is sharp, darting pain in it. There may be a sharp shiver, or rigor, but this may be absent. The pain in the breast increases, and it becomes very tender to the touch. The hardness and fulness continue, and the part becomes red. Inflammation proceeding, the swelling increases ; there is a distinct tumour ; the pain and tenderness are severe ; the skin is hot, red, glazed, or shining. Instead of the sharp darting pain, there is a painful throbbing in the breast. The glands in the armpit become swollen and the arm stiff at the shoulder. There is pain when the arm is moved. Shivering may occur again. When this happens, and the pain has assumed a throbbing character, with the surface glazed, matter has formed—the inflammation has run on to abscess. As soon as it is certain that matter is present, it should be at once let out. This will save an immense amount of suffering, and in many cases effect a rapid recovery. On the other hand, if it is allowed to burst of itself, the suffering of the patient will continue for a long time, and until the discharge escapes is of a very severe character. The matter is often formed deeply in or under the gland, and in these cases it takes a long time to reach the surface and escape, and during the whole of this time the throbbing pain is severe.

Moreover, when it has escaped after this long delay, the process of recovery is much less rapid than when it is let out early. Sometimes several abscesses form in succession, and the breast becomes a mass of almost stony hardness. When abscess has occurred once, it is liable to occur again, though by judicious treatment it may in many cases be warded off.

*Treatment.*—The breasts should be periodically emptied. Frequently some parts of the glands remain hard and full, while the rest is soft and flaccid. When this happens, gentle friction with warm olive oil should be made over the full part. When inflammation has set in, cold lotions should be tried ; when these fail, hot fomentations and poultices should be applied until matter is formed, which should be immediately allowed to escape. Poulticing for a few days, and the application of pressure, with liberal diet, will, in most cases, effect a rapid cure.

## CHAPTER XVI.

## MANAGEMENT OF THE NEW-BORN INFANT.

Clothing—Food—Wet-nurse—Feeding-bottles—Sleep, Cleanliness, and Bathing—Light, Air, and Exercise—Diseases of Infancy.

WE consigned the new-born child to a warm flannel to be placed in a comfortable place, either on the bed or near the fire, according to the time of year, temperature of the room, &c. We must now return to it in order to prepare it for its future, whatever that may be. The first duty to it is a thorough washing with soap and water. The child is usually covered by a whitish curdy or soapy material, all of which has to be removed in the first bath. Having washed and carefully dried it with a soft towel, the folds formed by the skin at the flexures of the joints, around the neck, under the armpits, inside the thighs and groins, should be powdered with a mixture of starch and oxide of zinc, in order to prevent irritation of the skin from rubbing of the parts against each other.

The next object that deserves attention is the navel-string. About two inches of this is left attached to the body of the child, and in the course of a few days, this, which undergoes a process of putrefaction, drops off at the navel. It is usually wrapped in a piece of cotton or linen which has been charred before the fire. A square piece of linen, about six or eight inches long, and four to six wide, is taken, and generally charred; then a hole is burnt through its centre; the navel-cord is put through this hole and wrapped in the folded linen. This charred linen serves to preserve the decomposing part sweet and free from offensive odour, the charred surface being antiseptic in its action. The cord withers and falls off about the fourth or fifth day.

*Clothing.*—A certain temperature of the body is necessary to existence. Too great an elevation, as well as too great a depression of temperature, are incompatible with life. For the purpose of retaining heat generated in the body and withstanding the effects of cold, clothes are worn. The child before birth was maintained at an uniform temperature equal to that of the mother, through its peculiar connection with her; and when it is born and becomes exposed to external influences it is necessary to protect it from such as are productive of evil results. One of these is cold, and it is natural to expect that its effects on a new-born child might prove serious. This is indeed the case, and it becomes necessary not only to clothe the infant warmly, but often to expose it to artificial heat, either in bed with the mother or near the fire. The baby clothes are generally of flannel, and are made of such length that they reach beyond the feet and can be folded up over them. In this manner all draughts are prevented from affecting the lower limbs and body of the infant.

*Food.*—The milk, which is the new-born child's natural food, is not formed in the breast usually until the third day. During this time the infant requires but



little nourishment: a little sugar and water, or a little milk with a good deal of water and a little sugar, will be quite sufficient. The child should be put to the breast early for reasons already given, and the infant's first food comes to be the milk formed in the breast. This is called colostrum, and possesses irritating properties, and acts as a laxative on the child's bowels. The bowels generally act spontaneously during the first and second day, and the motions passed have a peculiar dark green colour. The action of the first milk carries all this substance away, and the matter passed assumes the natural yellow colour. Should the bowels remain without acting until the milk has formed in the breast, there is no need for anxiety or alarm; nor should laxatives, in the form of castor oil or brown sugar, be given. They may do harm by irritating the stomach and bowels, and set up an obstinate diarrhoea. It is better to wait until the laxative prepared by nature can be administered. If the mother be strong and has sufficient milk, the child should for the first seven months be fed with nothing else.

Circumstances may arise which render it impossible for the mother to nurse her infant. When this happens, one of two courses may be followed—a wet nurse may be obtained, or the child may be “brought up by hand.” Of these there can be no question which is the better. The food best suited for the infant is breast milk, and when possible it should be obtained. No wet nurse should be employed unless she has been seen and recommended by a doctor. The selection of one is a question of very great importance, for upon it will depend the health of the child. She should be between the ages of nineteen and twenty-eight; healthy, and from the country if possible; free from skin rashes or any disease which could be transmitted to the child. The breast should be well developed, secrete sufficient milk, and the nipple ought to be well formed and free from fissures or excoriations. Her child should be as nearly as possible of the age of the child which she is to nurse. If her child is strong, healthy, and well nourished, or if she has nursed previously in a satisfactory manner, it speaks greatly in her favour. Her diet should be carefully regulated. The belief that a woman cannot nurse unless she takes a certain quantity of stout or ale daily is much too prevalent, and mothers anxious for the welfare of their children not uncommonly over-stimulate their nurses, and thus bring about evils they wish to avoid. As a rule, two glasses of ale or stout a day are ample, and unless the nurse has been accustomed to take malt liquor she should be allowed none. The diet should be plain and easily digestible: meat, bread, and vegetables, in the quantities she has been used to. Over-feeding and over-stimulation is sure to upset the stomach and alter the character of the milk, so that it irritates the infantile stomach, sets up diarrhoea and vomiting, which are frequently difficult of control. It may even upset the secretion of milk, and in some cases suppress it altogether.

The second method—rearing the child by hand—should be avoided, if possible; but circumstances may arise in which it becomes inevitable. In these circumstances the object should be to obtain a substitute for mothers' milk, which, at the same time, resembles it as nearly as possible in character. The milk of different animals varies much in composition, some containing an excess of water, others an excess of fat, or of casein or cheese-making material. The milk of the

ass or of the goat resemble most that of the human mother, and form, perhaps, the best substitute for it, and when possible one of them should be obtained. This is, however, frequently not possible, and then it is necessary to fall back on cows' milk. Cows' milk is much richer in solid matters, but poorer in sugar and fatty matter than mothers' milk. It is, indeed, too rich for the young infant, and when given in its natural state is sure to upset the stomach, give rise to indigestion, acidity, vomiting, and diarrhoea. With a view to render cows' milk more like that of the mother, it is necessary to add water to dilute it, sugar to sweeten, and cream to supply the fatty material. One table-spoonful of good milk, two of water, one tea-spoonful of cream, and a little white sugar, form the best mixture. It should, however, be stated that when the milk is of a poor quality the quantity of water added should be less. No solid food should be given for the first six or seven months, and milk should in no case be thickened by means of corn-flour or meal of any kind, arrowroot, &c. Such substances the infant's stomach is unable to digest, and evil consequences will surely follow their administration.

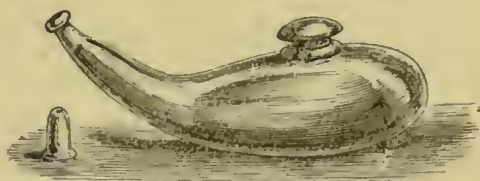
Mothers and nurses are often anxious to obtain milk from one cow. This, in the majority of instances, in large towns, is impossible, and, moreover, it is not desirable. It is better to obtain milk from cows feeding in the country than from those kept in stalls in town. The milk of any one company in large towns is usually obtained from several farms situated in the same district. The milk of several cows is mixed together, and there is no evidence that this mixture proves in any way noxious to the infant. But we would repeat that the milk should be obtained from cows fed in the country. When a child grows and thrives, and becomes strong and fat, it is often thought that it requires not only more food, but requires solid food, or the addition of flour or arrowroot, or one of the many "infants' foods" invented. This is the greatest error. The strongest proof that the child takes sufficient food is the fact that it thrives—the very fact on which the erroneous belief is based. In such a case, we would strongly urge, "let well alone." As to the inventions called "infants' food,"—many of them exceedingly injurious from a chemical point of view, and advocated by the pettiest theories—we can only say, avoid them. They should never be administered, except when advised by a medical man. From the first, a child should be taught to feed at regular intervals. A healthy infant should sleep when it is not being fed or bathed. At first, it should be fed every two hours during the day. It should be taught to sleep the greater part of the night. If it is fed the last thing at night, about eleven o'clock, it requires nothing afterwards until four or five in the morning. At that time it may have a little milk and water, and brought to the mother about seven or eight o'clock.

The same rule should be observed when it is brought up by hand.

*Feeding Bottles.*—These are of the greatest service when properly used. They are made so as to allow the child to suck its food gradually, and thus to prevent its mouth being too rapidly filled, and to imitate as far as possible the natural method of feeding. They are made of various shapes. Some have long india-rubber tubes attached to them, through which the food is sucked. These are the worst form, for



it is almost impossible to keep them sweet and clean. The best form is that represented in the accompanying illustration. It can be obtained of any druggist. It has a teat of india-rubber; it ought to be made of natural black india-rubber, for the caoutchouc has an offensive taste and smell. This form is easily cleansed and preserved sweet. For this purpose it should be kept, when not in use, in cold water. In summer, when milk is more liable to turn sour, a very small pinch



FEEDING BOTTLE.

of carbonate of soda may be added to the water; but it should be thoroughly washed off before use. This bottle has the further advantage, that the child cannot go to sleep with the teat in its mouth. Both mothers and nurses are too fond of giving the child the bottle to send it to sleep: it is a practice fraught with the greatest evil. The milk is retained in the child's mouth, turns sour, and sets up dyspepsia, diarrhœa, and vomiting. Whenever the child has taken food its mouth should be wiped with a soft piece of linen moistened with water, so as to cleanse the gums and sides of the cheeks from the adhering milk.

We have stated that the infant should be fed at regular intervals. Nothing should be allowed to interfere with this rule. The cry of a child is generally regarded as a sign that it requires nourishment, or at least that then it should be offered some, but it is frequently not the case. Many things cause the child to cry besides the want of food, as an uneasy position, cold, noise, and, not least, over-feeding. More children cry from the pain and evil produced by over-feeding than from under-feeding, and when this is borne in mind it will be seen that the breast or the bottle is not the proper remedy for the trouble.

*Sleep.*—We have said that a child should sleep during the intervals between feeding-times. As a rule, the more a child sleeps the better he thrives. Infants should not sleep with the mother or nurse, but in a cot. When it is absolutely necessary that an infant should sleep with its mother, it should never be allowed to do so with the nipple in its mouth: it is quite as bad as to have the teat of a bottle in it.

When a child is sleepless or restless, no sleeping-draughts or soothing-syrups should on any account be given. Indeed, no medicine of any kind, except a tea-spoonful of castor oil, perhaps, should be given to an infant without the advice of a doctor. Patent medicines going by the name of soothing-syrup, or any other containing opium, are most dangerous in their effects, owing to the remarkably powerful influence exercised on the infant's constitution by soothing-syrups. Numerous deaths have resulted from their administration, besides incalculable injury to the health of many who have survived their poisonous effects.

If the rules just given with regard to feeding and sleep, and those about to be given about cleanliness, be accurately observed, children born healthy will thrive, and give but little trouble; on the other hand, if neglected, diseases are sure to follow—diseases which in many cases ultimately prove fatal.

*Cleanliness.*—Bathing is useful not only for cleanliness, but inducing sleep, allaying irritation, &c. A child should be bathed night and morning in warm water.

Dr. Combe says :—

“On account of the great susceptibility of cold which exists in infancy, and the difficulty with which the system resists the influence of any sudden change, the temperature of the water ought, at first, to be nearly the same as that of the body, namely, about 96° or 98° Fahrenheit, and always to be regulated by a thermometer as the only test. If the nurse judge by the hand alone, she will often commit an error of several degrees, according to the varying state of her own health and sensations. The younger the infant, the more rigidly should this standard be adhered to; as it is not till after growth and strength have made some progress that it becomes safe to reduce the standard by a few degrees.

“In addition to the regular morning ablution, the tepid bath should be repeated every evening for a few minutes. Properly managed, and not too warm, it has the double advantage of soothing the nervous system, which is always irritable in infancy, and of sustaining an agreeable circulation of the blood towards the surface, and thus warding off internal disease. It ought not, however, to be too long continued, or used in a cold room, or immediately after nursing or feeding. With these precautions, the most unequivocal advantages often result from its use, especially in scrofulous and delicate children. For restless and irritable children, also, the bath is often of immense advantage, from the quiet and refreshing sleep which it rarely fails to induce. As a sedative, too, it is of great value in subduing nervous excitement. But when used too warm, or continued too long, the bath is apt to excite undue perspiration, and to increase the liability to cold.

“We occasionally, though rarely, meet with children who, from mismanagement or some other cause, are frightened by immersion in warm water, and with whom the bath decidedly disagrees. In such instances, of course, it should be given up, and simple washing and sponging with tepid water be substituted. But in all circumstances, the greatest care must be taken never to allow an infant to be exposed to the air with a skin even partially wet; for imprudent exposure may be productive of some serious inflammatory affection. Many of the complaints made against the use of the bath arise entirely from improper management and the neglect of proper precautions.

“Some physicians and parents prefer the cold to the tepid bath, even from birth; but reason and experience concur in condemning it, and it is only when the infant is strongly constituted that it escapes from the use of the cold bath unhurt. After the lapse of a few months, however, the temperature of the water used for the morning ablution should be gradually reduced, provided the child continue healthy and the season of the year be warm. But to make any sudden change in winter, or when considerable delicacy exists, would be attended with risk. I need scarcely add that when sufficient reaction and warmth do not speedily ensue after the use of cold bathing, it ought to be immediately given up, and the tepid bath substituted in its stead.”

Cleanliness should be observed, moreover, in the frequent change of napkins. A child should not be allowed to lie any time in its own urine or motion. As soon as these are expelled they should be removed, the child thoroughly cleaned and dried, and then greased with olive oil or lard. This is a very good plan: better than



powder ; for it not only prevents excoriation, but also, to a certain degree, the direct contact of the excreta with the skin. It protects the skin from their irritating effects. When this has been done, a new and clean napkin should be applied. The napkins which have been wet with urine are sometimes merely dried before the fire, and used again without being washed. This is a practice to be utterly condemned. The napkin thus prepared is not clean ; it is loaded with substances which irritate the skin, and give rise to sore bottom. Napkins once used should be thoroughly washed and dried before they are again applied to the child's body.

*Light, Air, and Exercise.*—During the first months of infancy, all the exercise which the child can take is of a passive character. It should be carried about in the open air. Children are frequently tossed or even thrown into the air, and caught again as they descend. This is a form of exercise which gives the child great pleasure, as is evidenced by the signs of joy manifested by it ; at the same time, it is not quite free from danger, for the child may slip out of the hands, or be missed in its descent. In such an event it would be liable to severe injury.

Light and air are necessary to the health of children as well as to that of animals and plants ; and it should be a rule to take infants out once or twice daily when the weather is fine, even from a very early age. After the first month, both summer and winter this should be done. At first the child cannot bear the light, and keeps his eyes always closed. His head and face should therefore be well protected by a covering. When he begins to look about him, a veil should be substituted for the head and face cover.

*Diseases of Infancy.*—The diseases which affect children during the first month are few. They chiefly regard the digestive organs, the stomach, and intestines. Diarrhœa is one of the commonest. It is due almost invariably to excess of or improper food. Children brought up on mothers' milk suffer little or not at all from this affection, while those brought up by hand invariably suffer at some period or other. The food given them is stronger than the stomach can digest. It is not assimilated ; it remains in the intestinal canal as a residue, and sets up irritation of the bowels. In these cases the child is always crying, draws up its legs as if in pain, suffers from colic, flatulence, passes wind, vomits its food—if it takes milk it returns curdled ; it refuses food, wastes, may become convulsed, and die. The motions may be passed ten, twelve, or twenty times in the twenty-four hours ; they are of a greenish colour, and smell very offensively. The child's bottom becomes red, sore, and inflamed. Thrush may set in and the diarrhœa become still worse.

The treatment of such diarrhœa should be the removal of the irritating matter from the bowels, and the administration of proper food. The first object is gained by a small dose (twenty or thirty drops) of castor oil. This the mother may venture to give to her infant ; but on no account should any other drug be given, except by the doctor's order. Having cleared the bowels, feed the child in the manner already described, and it will in all probability recover.

*Constipation* occasionally occurs in children. In such cases it is a mistake to administer laxatives. The best treatment consists in the introduction of a piece of soap into the bowels, to be left there until expelled. This is usually sufficient to excite the action of the torpid organ.

*Jaundice.*—Young children are subject, sometimes, to jaundice soon after birth. The skin and whites of the eyes become yellow; the stools may be pale or retain their natural colour. This condition generally passes off in a few days without treatment. If the bowels be confined, an occasional tea-spoonful of castor oil will help the cure.

*Thrush.*—Sometimes the mouths of children—the tongue, lips, and cheeks—become covered with numerous small white spots: this is thrush. It is due to imperfect nutrition, dependent on improper food.

*Treatment.*—Let the food be regulated, and the month be washed out with a weak solution of borax—about twenty grains of borax to the ounce of water.

*Sore Bottom.*—A child should rarely or never suffer from this. If care be taken in changing the napkins as soon as they have become soiled with urine or motions, to dry the parts properly at each change, to observe absolute cleanliness, and to anoint the part with olive oil, zinc ointment, or to apply fuller's earth, a sore bottom becomes almost impossible. In certain cases, however, when the child has become reduced and weakened by bad feeding, prolonged diarrhœa, vomiting, and thrush, the bottom may become sore in spite of all precautions. In such cases the treatment must be directed to the more serious mischief, and the aid of the doctor called in.

## CHAPTER XVII.

### MONTHLY NURSING.

MUCH has been already said—under the heads Management of Labour, Lying-in, the milk and the infant—of what pertains to the duties of the monthly nurse. There are, however, still a few points which come especially under this head.

Nurses are now trained for special branches as well as for general nursing. The time is gone when a woman who is unfit for any other occupation can turn nurse; and though an occasional "Sairah" may still be seen, yet the days of that genus are passed. Good monthly nurses are now trained in our lying-in hospitals, and there is, as a rule, no difficulty in obtaining one from these charities or from one of the nursing institutions.

A nurse should not be so young as to be giddy, nor so old as to be useless. She should be cleanly, sober, truthful, and, above all, have a well-governed tongue. The want of the latter quality totally disqualifies a woman for nursing, whatever other qualifications she may possess.

Her dress should be plainly made, and of a material that can be washed. She should have a light step and a kindly disposition; a light sleeper, for she should wake at the faintest cry of the infant as well as at the call of the mother.

The monthly nurse, if possible, should be a person known to the new mother or her friends.

It is desirable that the nurse should be in the house two or three days before



labour sets in; in these she has time to arrange the bed and the lying-in room, and get everything ready for the expected event.

The following articles should be in the lying-in room ready for use:—

Baby's clothes.	Thread or worsted for tying the navel-string.
Basins and water, hot and cold.	A flannel to receive the child.
Cold cream or lard, and olive oil.	Needles and thread.
Napkins.	Scissors.
Towels.	Waterproof sheeting.
Safety-pins.	Powder-box.
Binder.	A Higginson enema syringe.
Sponges.	

When labour is about to begin, if the bowels have not already been freely moved, the nurse should give a clyster of soap and water. This will save future trouble and inconvenience.

Before, or as soon as labour sets in, the bed ought to be made ready. This is done in the following manner:—Uncover the mattress, and over the lower half of it spread a sheet of mackintosh, and upon this again a sheet folded double; upon this the ordinary clean sheet upon which the patient is to lie after the labour is ended. Upon this sheet another piece of mackintosh should be spread, then a folded blanket, and lastly, a folded sheet. These should cover the lower half of the bed so as to reach up to the patient's waist.

When the labour is over, the upper piece of mackintosh, blanket, and sheet, are to be withdrawn, and a dry clean bed is left for the new mother to lie upon.

A patient should walk about during the process of labour, for the force of gravity favours the progress of the child. When she goes to bed, she should be dressed in such manner as to give rise to as little trouble as possible in the readjustment which is necessary when the process is ended. This is done as follows:—A clean chemise and night-dress are put on just before going to bed; they should be rolled up under the armpits; and the soiled dresses should be taken off and fastened round the waist, so as to form a covering for the body, and be removed without any serious trouble when the labour is over.

Thread or worsted for tying the cord should consist of several lengths of coarse white thread or worsted, or a piece of narrow tape answers the purpose equally well.

The binder should be made of stout calico, folded, about two yards in length, and about a foot or fourteen inches in width.

Having seen that all the articles required are ready at hand, and labour having set in, new duties devolve upon the nurse. She should see that the bowels and bladder are thoroughly emptied at the commencement of labour, and the latter organ from time to time afterwards. Women complain of cramp in the limbs at some stage of the process; in such cases the nurse should gently rub the part in order to afford relief.

Small quantities of food may be given to, but not forced upon, the patient during labour; it should be fluid: beef tea, milk, and tea. Cold water may be given in small quantities, but big draughts of it should not be allowed. Solid food

is not necessary; and stimulants should not be given at all, unless expressly ordered by the medical attendant.

Vomiting is of frequent occurrence during labour. It has no serious import; on the contrary, it is often considered to be a favourable sign, for it is said that a sick labour is a safe one.

When the pains assume a forcing character and go to the back, the waters having come away, the medical attendant should be hastily summoned. As the pains in the back increase in severity, gentle pressure to support that part gives relief, and the lying-in patient generally expects it and calls for it. As the child is about coming into the world, the nurse is often requested to support the patient's knees, so as to separate the limbs, and relieve the patient of the effort required in maintaining it in an elevated position.

Should any unfavourable symptoms appear during the course of labour or of the lying-in month, the nurse should at once send for the doctor and communicate the fact to him. Convulsions occasionally occur, and they are of grave import. At other times the patient may faint. In this case it is probably due to loss of blood, and the nurse should immediately examine to see if such is the case. She should press on the uterus, in the manner described under Labour, until the doctor comes. Nurses, under circumstances of this kind, are fond of foretelling the course that events will take; it is a very foolish practice, for it is not possible for them to form an accurate opinion, and consequently they are as often wrong as right; the only results of such imprudence is to give trouble to the family and attendant.

A nurse should keep a careful watch over her patient during the lying-in month. She should see the breasts, and find out if the secretion of milk is abundant and sufficient for the child; she should carefully examine the discharges, observe the quantity and quality, and report to the medical attendant upon them. If they be deficient or offensive in character, if the patient complains of severe or lasting pain in the abdomen, the breasts, or the limbs, should she become feverish or have a shiver, the doctor should at once be made aware of it; for some of the diseases to which women are subject at this period yield rapidly when attacked early, but run a prolonged course when once they have taken firm hold of the patient.

For further treatment of the lying-in period and of the infant, see Management of Labour, &c.



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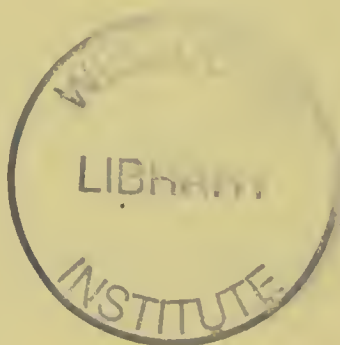
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